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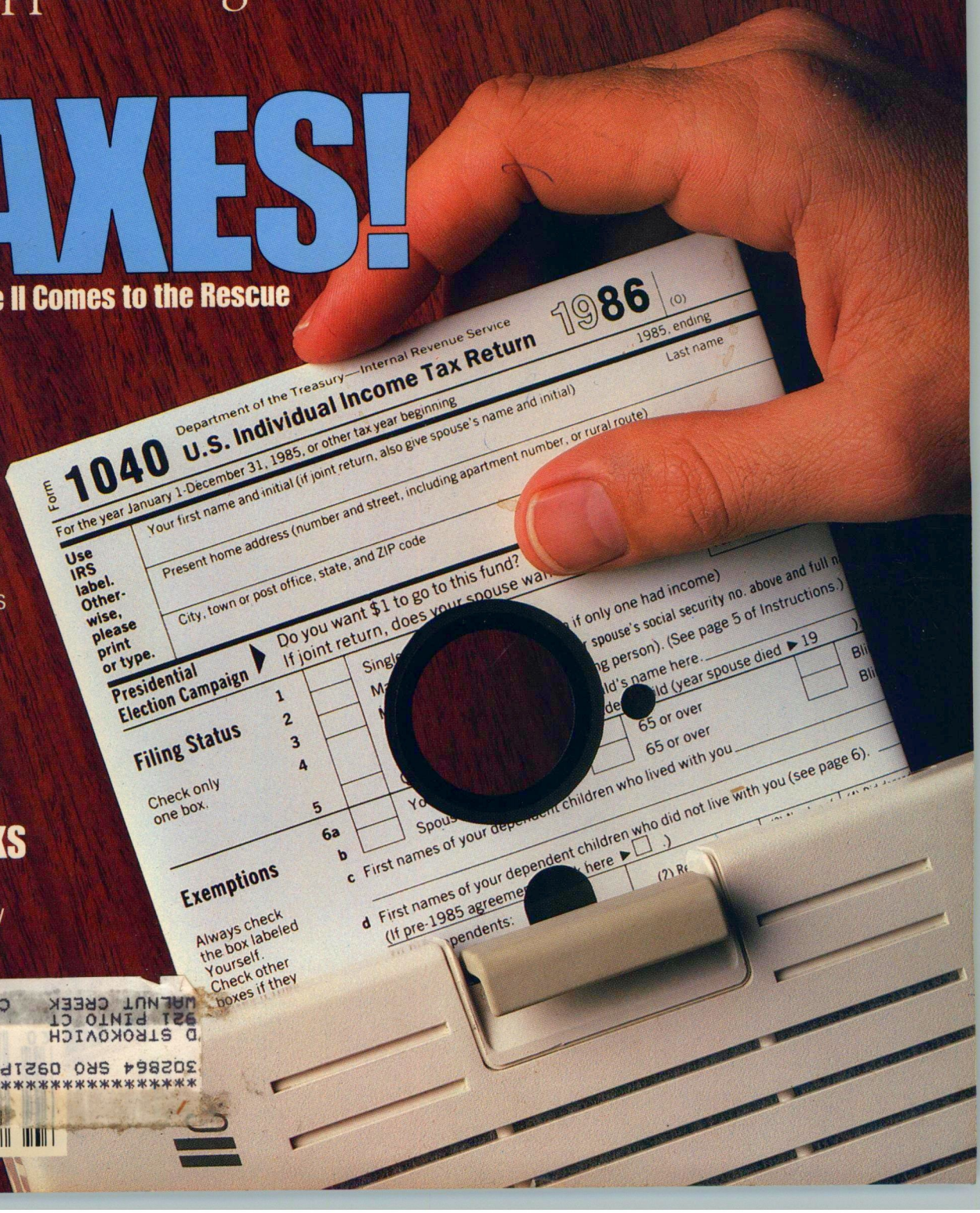

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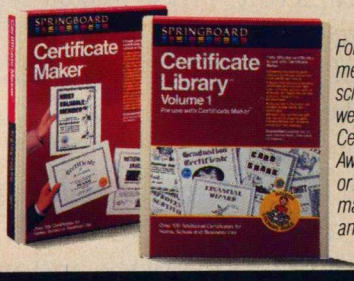

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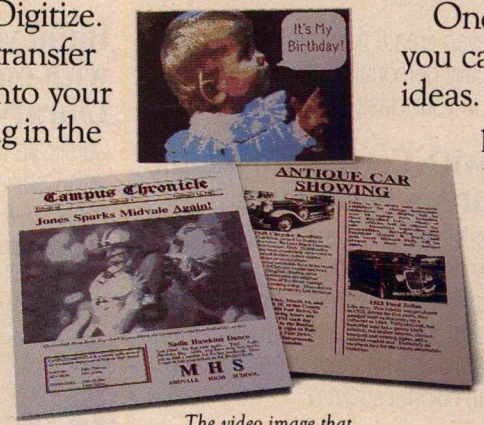

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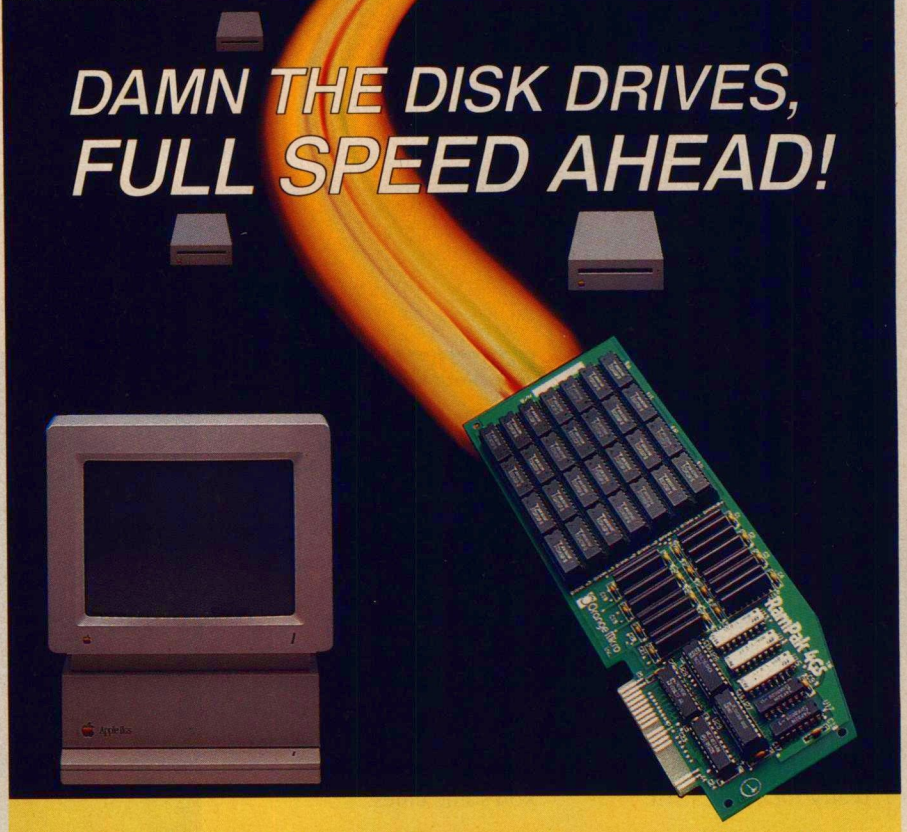

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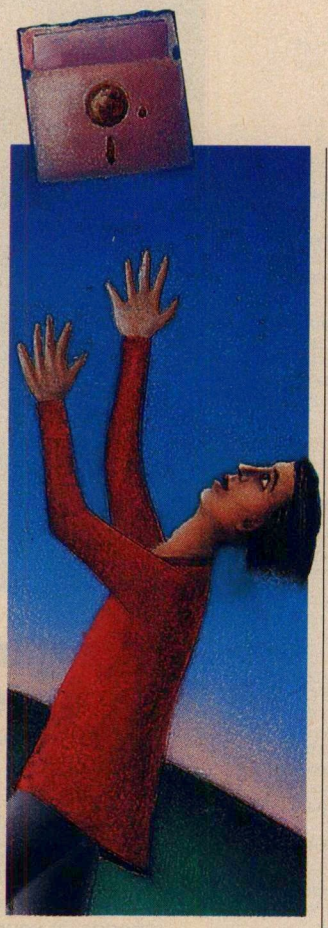

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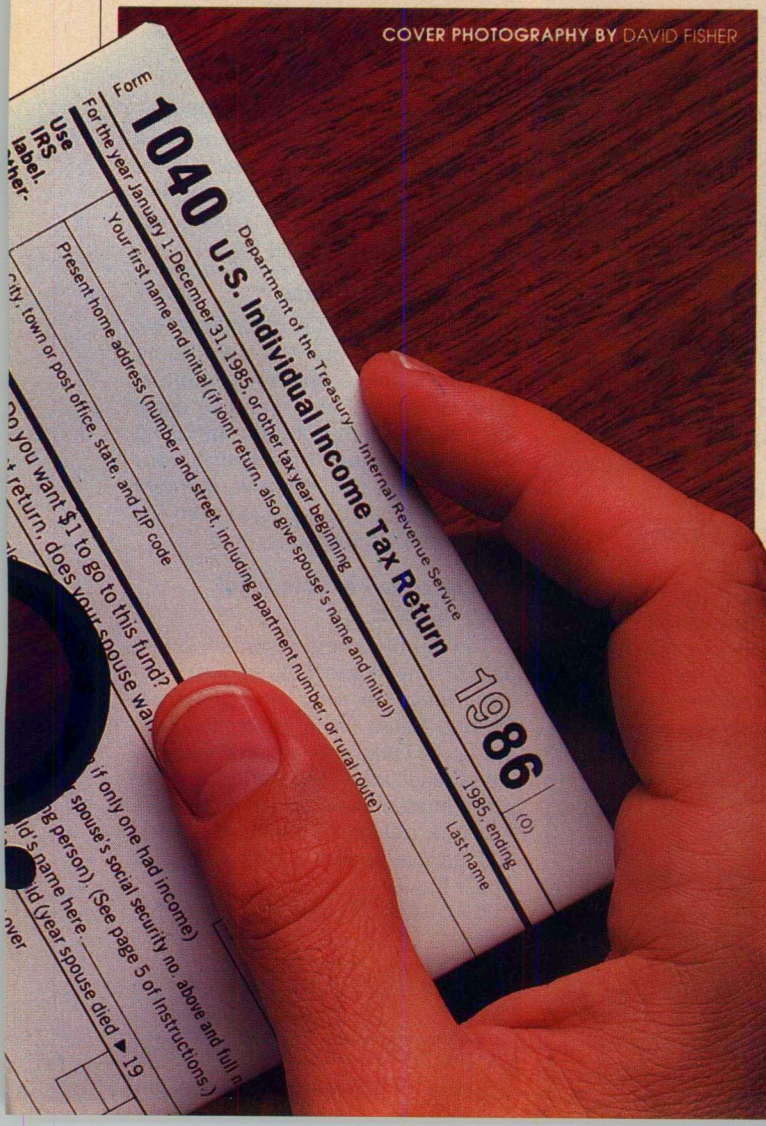

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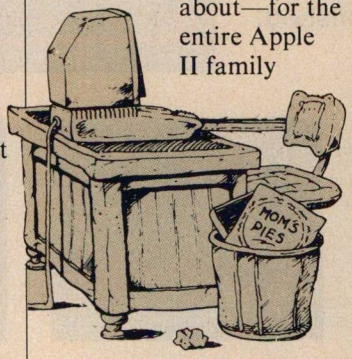

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BY ROB SWIGART

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(Top Guns don't always fly on air . . . Some fly on water)

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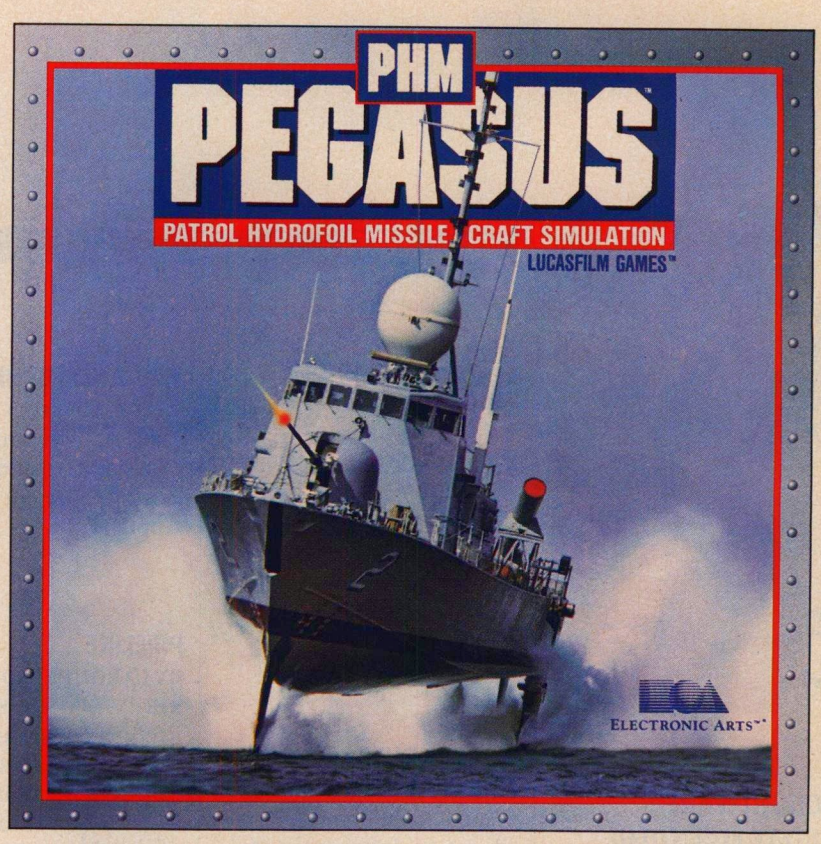

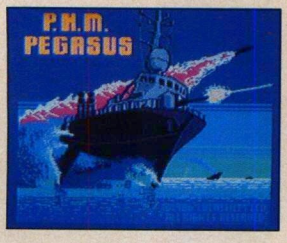

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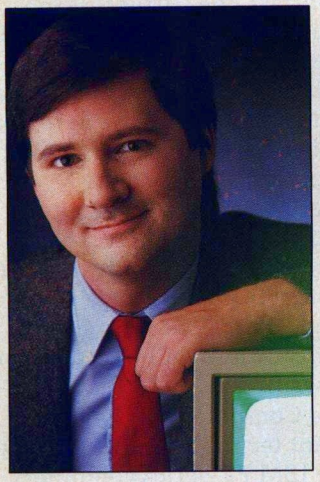

Apple wants to give programmers a way to make all application software work the same way, no matter if it's on a current Apple II-series computer or Macintosh—or even on any new version of these machines.

THE VIRTUAL-DEVICE INTERFACE

Many of you probably know that the term *user interface* refers to the way in which people interact with a computer. And most of you are familiar with Apple's graphic user interface and its mouse, windows, and pull-down menus. This user interface was inspired by work done at Xerox, pioneered by Apple on the Lisa, popularized on the Macintosh, retrofitted onto the IIc and enhanced IIe, and most recently packaged with color graphics and multichannel sound in the Apple IIGS .

Apple started developing its user interface many years ago and has put tens of millions of dollars into refining it. Apple's strategy is to create a simple way to operate a computer that is common to all its machines. Apple wants new software for the Apple IIGS to work just the same way as software for the Macintosh does.

Another Interface

Although Apple's user interface gets a lot of attention because it's what you see when you look at the computer, Apple is developing another important software interface that you've probably never heard about. It's called the virtual-device interface.

Although the term *virtual-device interface* sounds like just another mouthful of computer babble, it's a term worth understanding, so bear with me while I try to explain what is admittedly a fairly esoteric concept. A virtual-device interface is a special software layer that lies between an application program and the computer hardware. In some ways a virtual-device interface is like an advanced type of DOS, except that DOS lets you control only the disk drives, whereas the virtual-device interface lets you control all the resources of the computer, including such other things as memory, processing, video display, input and output devices, and so on.

Instead of having application software interact with the actual computer hardware, the software interacts with the virtual device: The virtual-device interface interprets these instructions from application software and converts them into machine-level instructions for the computer.

It's in the Toolbox

Apple places its virtual-device interface in the computer's ROM chips. In order to create a common virtual-device interface, it designed the Macintosh Toolbox ROM and the IIGS Toolbox ROM to be similar. In fact, one of the reasons that the sound tools for the IIGS were so slow in coming was that Apple wanted to make sure that they matched sound tools for future Macintosh products.

Apple plans to expand the Macintosh Programmers' Workshop to allow you to write a program using C or Pascal that will run on either a IIGS or a Macintosh. Because of the two computers' similarities, I'm sure we'll see a lot of Macintosh software start showing up on the IIGS .

What the user interface does for the computer's software the virtual-device interface does for the computer's hardware. Just as a common user interface makes different types of application programs look amazingly alike to a person operating a computer, the virtual-device interface makes different types of hardware look amazingly alike to the software; it lets a program treat a 16-bit computer with a 65816 processor much the same as a 32-bit computer with a 68000 processor. Thus the key virtue of a virtual-device interface is that as long as you keep the virtual device the same, you can make major changes to the computer's hardware without affecting the computer's existing software.

If the Apple IIGS or Macintosh gets a different processor, bigger screen, or better sound circuitry or undergoes any other type of hardware modification, application programs that use the virtual-device interface will be able to take advantage of the computer's new capabilities immediately. Software developers who play by the rules and follow Apple's programming guidelines for the IIGS and Macintosh benefit because these guidelines help them create programs that work

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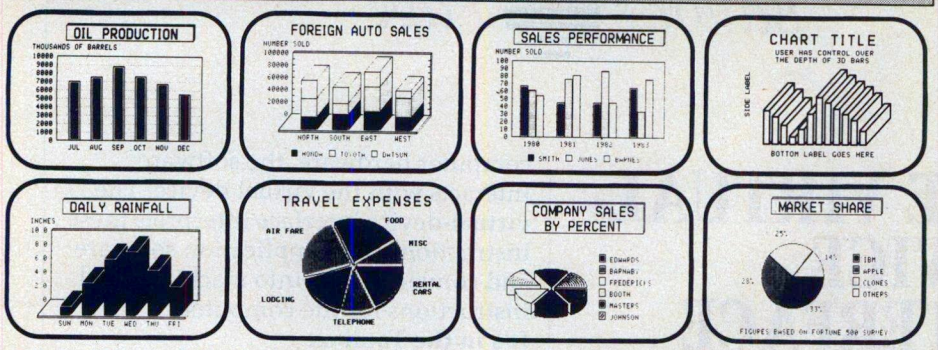

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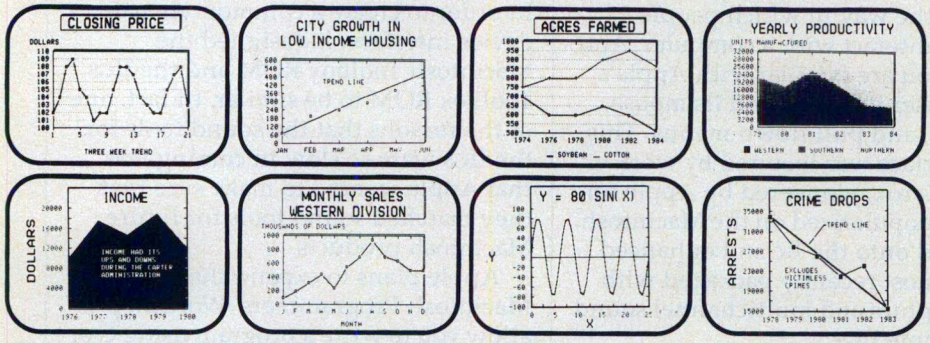

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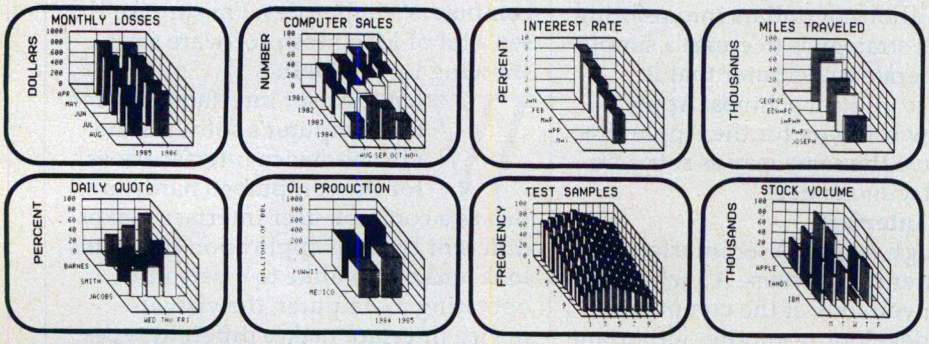

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with the virtual-device interface and not the actual computer hardware. That way if Apple changes the design of its computers, all the existing software that followed the programming guidelines will still work.

In contrast, the current generation of software for the IBM PC series interacts directly with the system hardware, which means that slight modifications in the hardware of an MS-DOS machine can make many application programs incompatible with the computer. Also, current MS-DOS programs will not be able to take advantage of new system features of new advanced IBM PC models automatically and will instead have to be rewritten.

Apple Computer will have a significant technological advantage over the IBM PC-series computers over the next few years, since Apple will be able to easily modify and improve its computers to take advantage of new hardware technologies without losing the existing base of software. Apple developers will benefit from Apple's virtual-device interface because most of their software will automatically run on new machines. And Apple users profit, because much of the software you already own will take advantage of new hardware features if you upgrade your machine to a future model.

New This Month

As promised, new things keep happening in *A+*. This month we're proud to announce the "*A+* Teachers' Toolbox," a monthly guide of selected educational software for teachers, parents, and students. Each month *A+* will get software recommendations from nationally recognized authorities on a specific topic, this month biology. Also new this month is "Laugh Track," which will feature computer humor. To start "Laugh Track" off, we are pleased to present the work of the talented cartoonist Eldon Dedini, whose cartoons have appeared in *The New Yorker*, *Playboy*, and *Esquire*.

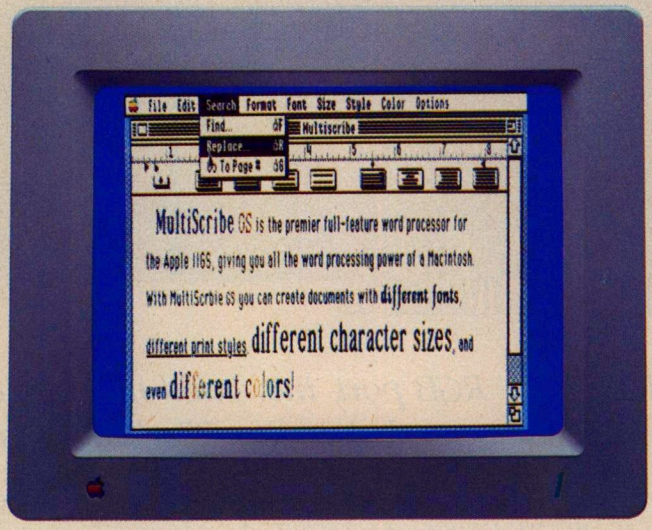
Read on and enjoy! ✚

Fred

FREDERIC E. DAVIS/**EDITOR IN CHIEF**

Here's more you can do with the new Apple IIGS.

Spectacular Vernacular.



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StyleWare introduces **MultiScribe** GS, the first of a new generation of word processors for the 512K Apple® IIGS.™ Like other StyleWare products, this new program was designed for ease of use, versatility and creativity. Using the super high resolution bit-mapped graphics, enhanced processor speed, and expanded memory of the IIGS, **MultiScribe** GS gives you advanced features such as multiple windowing, color printing and enlarged document size capabilities (print documents as large as memory allows!), creating spectacular writing possibilities.

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Illustration Sensation.

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Use **TopDraw**'s editing function to edit colors and patterns. Draw with up to 16 colors at once, using color patterns as pen colors or fill patterns, and create millions of color combinations. And because creativity isn't always limited to an 8½ x 11 inch page, **TopDraw** lets you print your creations up to 8 pages in length and width.

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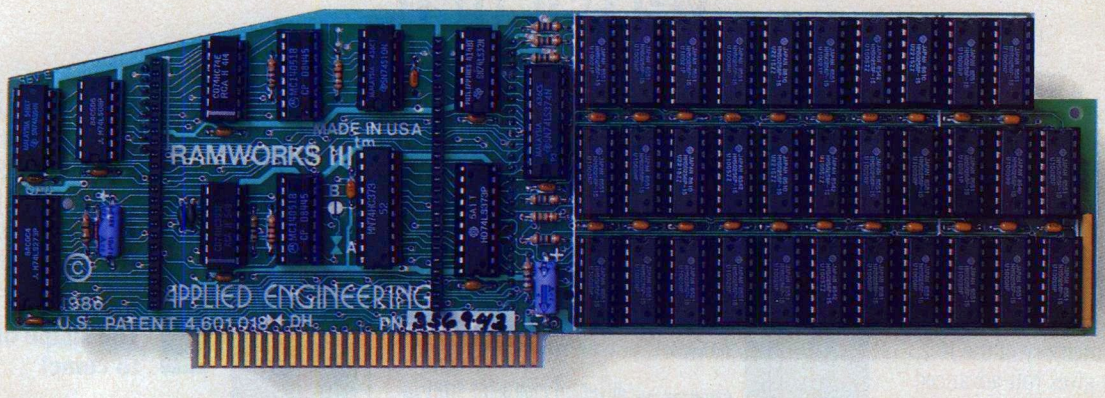


With battery backed RAM port, RGB port, increased memory capacity, full software compatibility and more compact design, RamWorks III is a generation ahead.

RamWorks III is the newest 3rd generation RAM card for the Apple IIe. It incorporates all of the technology and improvements that years of experience and over a hundred thousand sales have given us. By selling more memory cards than anyone else and listening to our customers, we were able to design a memory card that has the ultimate in performance, quality, compatibility and ease of use. A design so advanced it's patented. We call it RamWorks III, you'll call it awesome!

The AppleWorks Amplifier.

While RamWorks III is recognized by all memory intensive programs, NO other expansion card comes close to offering the multitude of enhancements to AppleWorks that RamWorks III does. Naturally, you'd expect RamWorks III to expand the available desktop, after all Applied Engineering was a year ahead of everyone else *including Apple* in offering more than 55K, and we still provide the largest AppleWorks desktops available. But a larger desktop is just part of the story. Look at all the AppleWorks enhancements that even Apple's own card does not provide and *only* RamWorks III does. With a 256K or larger RamWorks III, *all* of AppleWorks (including printer routines) will automatically load itself into RAM dramatically increasing speed by eliminating the time required to access the program disk drive. Switch from word processing to spreadsheet to database at the speed of light with no wear on disk drives.

Only RamWorks eliminates AppleWorks' internal memory limits, increasing the maximum number of records available from 1,350 to over 25,000. *Only* RamWorks increases the number of lines permitted in the word processing mode from 2,250 to over 15,000. And *only* RamWorks offers a built-in printer buffer, so you won't have to wait for your printer to stop before returning to AppleWorks. RamWorks even expands the clipboard. And auto segments large files so they can be saved on two or more disks. You can even have Pinpoint or MacroWorks and your favorite spelling checker in RAM for instant response.

RamWorks, nothing comes close to enhancing AppleWorks so much.

The Most Friendly, Most Compatible Card Available.

Using RamWorks III couldn't be easier because it's compatible with more off-the-shelf software than any other RAM card. Popular programs like AppleWorks, Pinpoint, Catalyst, MouseDesk, Howard-Soft, FlashCalc, Pro-Filer, Managing Your Money, SuperCalc 3a, and MagiCalc to name a few (and *all* hardware add on's like ProFile and Sider hard disks). RamWorks is even compatible with software written for Apple cards. But unlike other cards, RamWorks plugs into the IIe auxiliary slot providing our super sharp 80 column text (U.S. Patent #4601081) in a completely integrated system while leaving expansion slots 1 through 7 available for other peripheral cards.

RamWorks III is compatible with all Apple IIe's, enhanced, unenhanced, American or European versions.

Highest Memory Expansion.

Applied Engineering has always offered the largest memory for the IIe and RamWorks III continues that tradition by expanding to 1 full MEG on the main card using standard RAMs, more than most will ever need (1 meg is about 500 pages of text)...but if you do ever need more than 1 MEG, RamWorks III has the widest selection of expander cards available. Additional 512K, 2 MEG, or 16 MEG cards just snap directly onto RamWorks III by plugging into the industry's only low profile (no slot 1 interference) fully decoded memory expansion connector. You can also choose non-volatile, power independent expanders allowing permanent storage for up to 20 years.

It Even Corrects Mistakes.

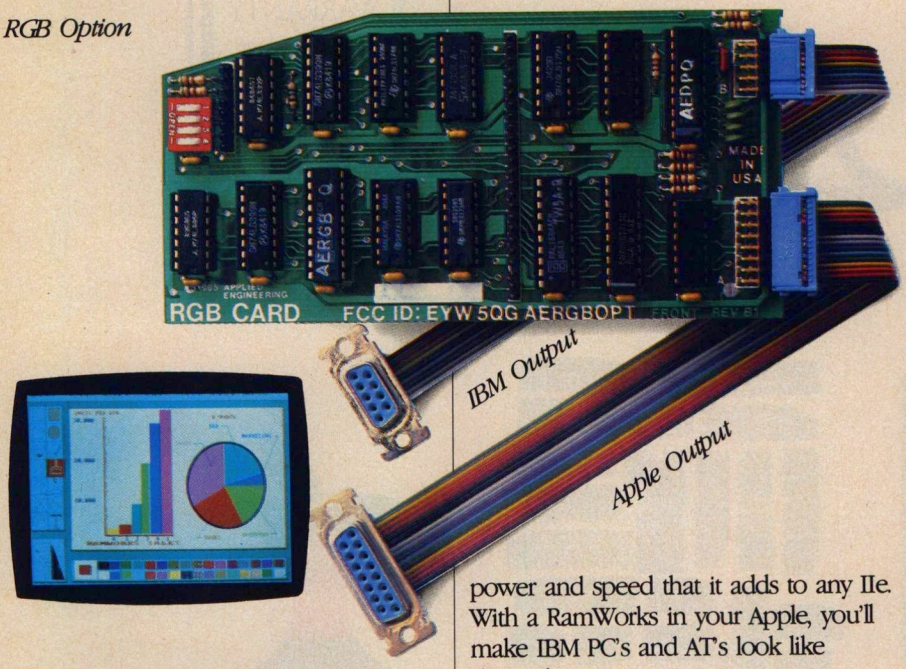
If you've got some other RAM card that's not being recognized by your programs, and you want RamWorks III, you're in luck. Because all you have to do is plug the memory chips from your current card into the expansion sockets on RamWorks to recapture most of your investment!

The Ultimate in RGB Color.

RGB color is an option on RamWorks and with good reason. Some others combine RGB color output with their memory cards, but that's unfair for those who don't need RGB *and* for those that do. Because if you don't need RGB

Applied Engineering doesn't make you buy it, but if you want RGB output you're in for a nice surprise because the RamWorks RGB option offers better color graphics plus a more readable 80 column text (that blows away any composite color monitor). For only $129 it can be added to RamWorks giving you a razor sharp, vivid brilliance that most claim is the best they have ever seen. You'll also appreciate the multiple text colors (others only have green) that come standard. But the RamWorks RGB option is more than just the ultimate in color output because unlike others, it's fully compatible with all the Apple standards for RGB output control, making it more compatible with off-the-shelf software. With its FCC certified design, you can use almost any RGB monitor because only the new RamWorks RGB option provides both Apple standard and IBM standard RGB outputs (cables included). The RGB option plugs into the back of RamWorks with no slot 1 interference and remember you can order the RGB option with your RamWorks or add it on at a later date.

RGB Option



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RamWorks III has a built-in 65C816 CPU port for direct connection to our optional 65C816 card. The only one capable of linearly addressing more than 1 meg of memory for power applications like running the Lotus 1-2-3™ compatible program, VIP Professional. Our 65C816 card does not use another slot but replaces the 65C02 yet maintains full 8 bit compatibility.

Endorsed by the Experts.

A+ magazine said "Applied Engineering's RamWorks is a boon to those who must use large files with AppleWorks...I like the product so much that I am buying one for my own system." inCider magazine said "RamWorks is the most powerful auxiliary slot memory card available for your IIe, and I rate it four stars...For my money, Applied Engineering's RamWorks is king of the hill."

"I wanted a memory card for my Apple that was fast, easy to use, and very compatible; so I bought RamWorks."

Steve Wozniak, the creator of Apple Computer

Apple experts everywhere are impressed by RamWorks's expandability, versatility, ease of use, and the sheer power and speed that it adds to any IIe. With a RamWorks in your Apple, you'll make IBM PC's and AT's look like slowpokes.

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RamWorks III is from Applied Engineering, the largest, most well supported manufacturer of Apple peripherals and the inventor of large RAM cards for the Apple. With our 5 year no hassle warranty and outstanding technical support, you're assured of the most trouble free product you can buy.

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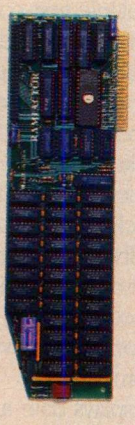

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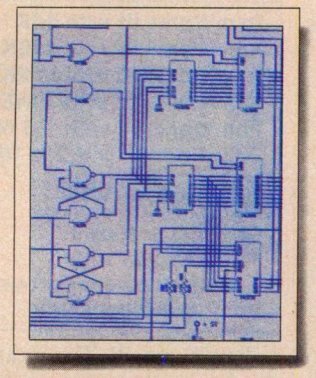

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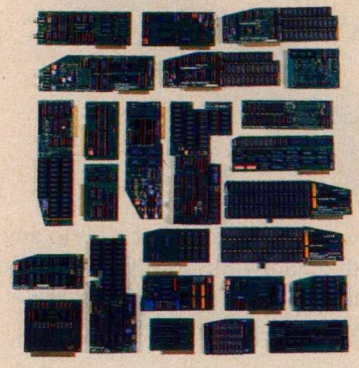

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Letters

CRUSADE FOR COMPATIBILITY

Dear A+: Generally I am not one to correspond through letters to the editor and prefer to lodge my complaints with the particular manufacturer. I can understand that you are probably fed up to here with the Pandora's box you opened with your editorial on copy protection—but I feel that the overwhelming and heartfelt reader responses, if the manufacturers ever read them, can only benefit the industry.

The inadequately addressed issue in all those letters you have published is that of software compatibility. Simply put, if I can't coordinate and customize what is otherwise an excellent "business" program, and if I can't make it work with my own hardware as well as other programs that have features I need, I don't want it anymore! If copy-protection systems and the use of unorthodox system filenames get in the way of such things as hard-disk drives, UniDisks, RAM cards, and other programs, or prevent me from making either my own archive copies or, in the case of my "transportable" IIc, working copies so I have to carry a minimum of hardware around with me, or it costs me time to discover that what I had hoped to do with the program is impossible, I won't use the program, will regret its initial purchase, and in all likelihood will not buy a product from that company again.

Were I a programmer, I could write my own routines. But like many my age, I grew up with no computer training and was exposed to computing only when I became hooked on wizardry. I strive to be an informed user, wishing only to get the most from any program I buy—and anything that makes my intended use difficult is frustrating. Having to work through hardware incompatibilities is bad enough—but as IIe and the IIc systems are expanded, the software incompatibilities worsen daily. Crusade against software incompatibility!

Robert J. Hampton
Saint Paul, MN

APPLE MARKET WARS

Dear A+: The Apple IIGS is a great achievement in computer engineering. Through the wizardry of today's technology, it can do everything the earlier IIe can do and more. Speed, memory, graphics, and sound are its advancements summed up, and behind the hardware we can see Apple's plan to capture the home, education, and small-business markets. Unfortunately, there's a glitch in the plan. Apple has to support two incompatible technologies: the Macintosh for business and the II series for home and education. The trick Apple must perform is to keep both computer lines at the heights of their technologies without their markets' overlapping. This has yet to happen. That is, the markets are well separated, but the Apple IIGS has clearly been subjected to technological stripping by the Macintosh department.

The problem is that if the IIGS's microprocessor, Western Digital's 65C816, were to run at its full speed of 8 MHz, the computer would have power equaling or exceeding that of the Mac, which employs a 68000 running at 7.8 MHz. If the IIGS had been allowed to run at full speed, Mac sales would have dropped sharply. So, the execs at Apple lowered the IIGS's speed to 2.8 MHz and set the standard RAM at 256K—plenty for games and word-processing programs but not quite enough for powerful business software. For now, the problem is solved: the markets for the two machines are clearly divided, and each appears to have strong technology. The reason why the IIGS looks fast is that 2.8 MHz is a great leap forward from the ancient 6502's 1 MHz in the IIe and IIc, and we forget to look up the 816's top speed—8 MHz. Products exist for the IIe that accelerate the clock rate to 3.6 MHz. When you compare a 3.6 MHz IIe and a 2.8 MHz IIGS, the technology blitz is revealed. The logical next step is to build an accelerator for the IIGS!

Supposedly, Applied Engineering is developing a 6-MHz accelerator card. So, the big question is, what will happen when it comes out? The IIGS will, in some cases, be faster than the premium (but, alas, unacceleratable) Macintosh. Then which machine do businessmen buy?—the "home" IIGS or the "business" Mac, which would be the weaker of the two? Apple is facing that problem at headquarters today. Its only option is to speed up the Mac, but that's a difficult task. If it can't do it, the Mac will die and the II will prevail. If it can, things will balance out better, but a battle for speed will begin within Apple: the II vs. the Mac. As Apple prepares a 25-MHz Macintosh, 16-MHz cards will appear for the IIGS. What does this mean for consumers? Guaranteed top-of-the-line technology in their Apple computers—just what they want.

Ah, a happy ending—but only my guess. It seems logical, though. I predict a faster Mac along with the IIGS accelerators within six months.

Mike Anderson
St. Louis, MO

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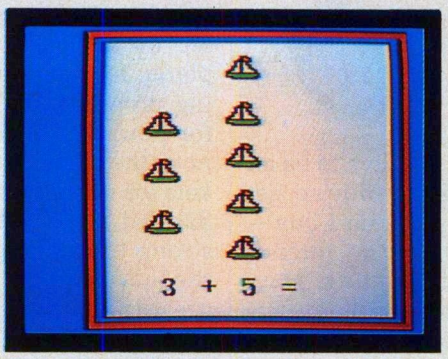
Stickybear® Math



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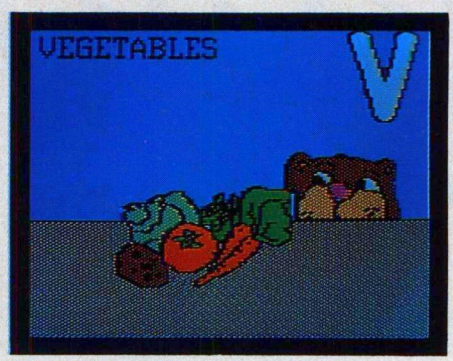

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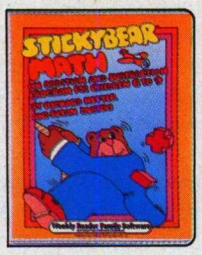

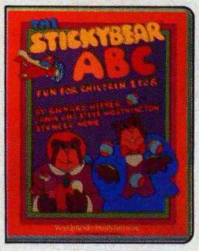

★ *Stickybear® Math* was voted one of the Best of the Best by computer previewers for *Electronic Learning*.

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BENDING THE RULES

Dear *A+*: What a charming tale of naiveté Mr. Lawrence relates in the November 1986 "Letters" column. I genuinely believe he feels his school is doing no wrong in making all 24 program disks available for use after paying for only 12 Instant Pascal packages.

It seems to me that the practice of allowing the 12 supplied backup copies to be used by 12 additional people is an oversight of policy that negates his school's concern over users potentially making unauthorized copies for their own use and convenience.

I don't think Mr. Lawrence realizes what serious trouble he could find himself in. His Instant Pascal packages are supplied with a backup copy to be used for archival purposes only. To make 12 packages do the job of 24 cheats the software developer out of the proceeds from the sale of the 12 additional packages his school needs to purchase. Mr. Lawrence should be told to put those 12 backup disks away in a safe place before he becomes the object of serious litigation.

As a software pirate, I can see the absurdity of his situation. My one borrowed copy of Instant Pascal serves my needs quite well. I've also had a chance to share a bit of knowledge about Pascal with a few friends. Also, a simple modification to my copy-deprotected disk allows this program to work from a RAM-disk, greatly improving its performance.

Mr. Lawrence, at least, has discovered (the hard way) that copy protection is nothing more than a nuisance to users and that there is a legitimate use for disk-copying programs.

"Sir Clive Getware"

WHERE TO GET APPLEWORKS TEMPLATES

An article in the November issue of *A+*, "AppleWorks Templates," mentioned the dozens of templates available through The Big Red Apple Club in Norfolk, Nebraska. It didn't mention, though, that The AppleWorks Users Group of Denver, Colorado (which is the original source for the templates) also distributes them. For further information, contact TAWUG, P.O. Box 24789, Denver, CO 80224.

IT RATES AN 'A+'

Dear *A+*: I have just finished reading the November 1986 issue of *A+*. Please accept my sincere congratulations on this excellent issue. The Apple IIGS coverage was superb, and Charles Rubin's "AppleWorks Templates" was the best article on AppleWorks that I can recall reading in quite some time. It is particularly gratifying to see that he included Apple III owners in his coverage.

Please keep up the good work.

George Blosser

A PERFECT CHOICE

Dear *A+*: I really want to thank you for the wonderful article "Write On" about available word-processing programs in the October 1986 issue. I have been searching for a new program for my Apple IIe that includes a spelling checker and a thesaurus. Thanks to your review, I found a program that serves my needs perfectly, aptly named Perfect Writer.

Cynthia Stabile
Hayward, CA

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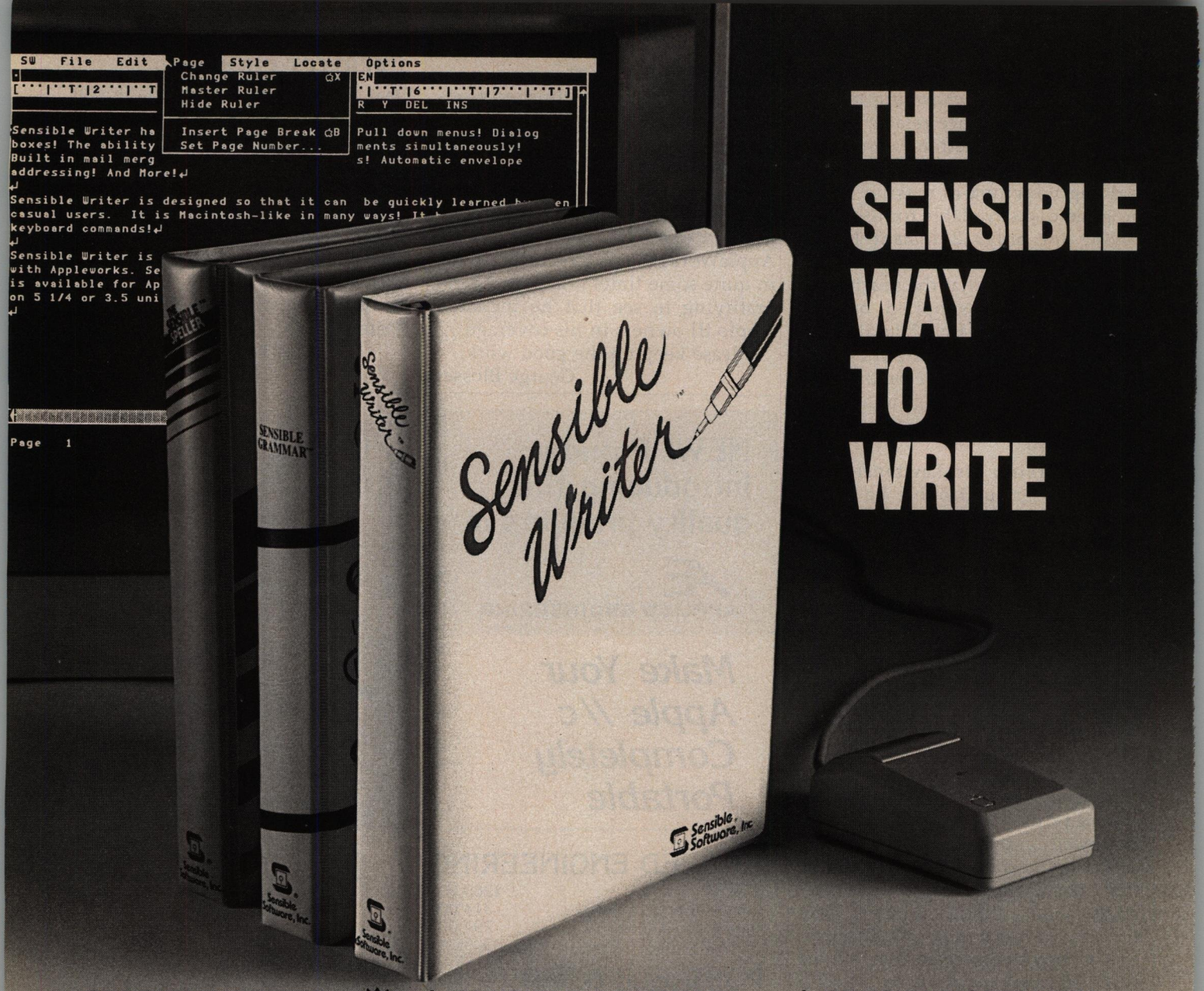

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*Sensible Writer, Sensible Grammar and Sensible Speller ProDOS work with the following programs, AppleWorks (Apple Computer, Inc.); Catalyst (Quark Inc.); Mouse Desk (International Solutions). Sensible Grammar and Sensible Speller ProDOS also work with the following word processors, AppleWriter-ProDOS version (Apple Computer, Inc.); Format II Enhanced-ProDOS (Kensington Microware); MouseWord (International Solutions); Mouse Write-text files (Roger Wagner Publishing); PFS:Write-ProDOS (Software Publishing, Inc.); Sensible Writer (Sensible Software Inc.); Word Juggler (Quark Inc.); Word Perfect (SSI Software); Zardax-ProDOS (Computer Solutions) and others. Sensible Speller ProDOS also works with HomeWord-ProDOS (Sierra On-Line); MultiScribe (StyleWare, Inc.); Word-Talk (Computer Aids) and WritingWizard (Scarborough Systems). Owners of trademarks indicated in parentheses. Black's Law Dictionary (West Publishing, Inc.).

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CIRCLE 165 ON READER SERVICE CARD

BY LISA RALEIGH AND CHIP CARMAN

NewsPlus

Dealers outdid themselves introducing the IIGS last fall, but had few systems to sell. Apple expects production to pick up this spring.

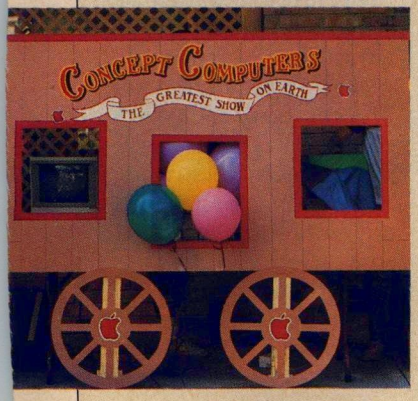
GOING ALL OUT

You can call them creative, perhaps even corny—and certainly a little bit richer for having done right by Apple. They are 30 Apple dealers across the country that Apple rewarded for their showmanship in introducing the Apple IIGS last September.

The grand-prize winner was Clinton Computer of Clinton, Maryland, which won $25,000 plus $500 for each of ten salespeople. The store hosted hundreds of people at a local amusement park for an "Apple II Family Day," where an illusionist unveiled the IIGS.

Other winners staged similar extravaganzas. Computers and Video, Inc., of Lincoln, Illinois, sponsored a parade through town. Concept Computer Centers of Beaumont, Texas, dressed its staff in clown outfits and brought in animals, jugglers, and magicians to create a circus at its store. And A+ Computers of Klamath Falls, Oregon, invited a doctor to oversee the "birth" of the IIGS. It's a shame that for all the fun and folderol, the dealers didn't have IIGS systems on hand (or even in the pipeline) to sell to the hundreds of people who showed up at these events. The IIGS remained in short supply through the end of the year, but Apple expects production to pick up steam as spring approaches.

IIGS INTRODUCTIONS BY CLINTON COMPUTER (TOP), CONCEPT COMPUTER (LOWER LEFT), AND A+ COMPUTERS (LOWER RIGHT)



NOW YOU SEE IT, NOW YOU DON'T

The Apple IIc in a liquidator's catalog?!? Say it ain't so. But there it was, adorning the entire back page of a recent catalog from COMB, a Minneapolis direct-marketing organization. COMB, which recently unloaded many thousands of the now-discontinued Commodore 64, claims that the IIc systems came directly from Apple. Apple says absolutely not, though. "I assure you that's not true," says Steve Sabbath, an Apple attorney.

Instead, says Sabbath, COMB acquired the systems on the so-called "gray market," in which an authorized dealer sells equipment to another sales outfit, rather than to a consumer. Apple's dealer contract prohibits gray-market sales—and it also prohibits mail-order transactions. In fact, Apple plans to launch a 1987 campaign to crack down on gray-market activities to ensure that customers get proper service from authorized sales outfits—and to make dealers happy by keeping Apple systems out of the hands of discounters.

From whatever source, COMB received between 1000 and 1500 systems last fall, according to a COMB sales supervisor. The company then advertised them for $999, which included a mono-

NewsPlus

chrome monitor, the older version of the ImageWriter printer, and 14 software programs. That's about equivalent to the average street price for this configuration. In December, the supervisor said that only 500 systems were left.

Sabbath says Apple called up COMB to try to figure out how many systems COMB had and asked to buy 1000 systems. COMB said it had only 500 to sell. Then, when Apple made another exploratory call and tried to place a similar order, COMB said it could sell the caller only 4 systems. At this writing, Apple was still trying to determine COMB's IIc source.

LIBERAL LICENSE

What sorts of deals do publishers make with schools that want multiple copies of software? All kinds.

At one extreme, there's Krell Software of St. James, New York. This company, which publishes SAT and ACT test-preparation software, allows school districts not only to make copies for classrooms from a master diskette, but it also lets them give students copies to take home with them! This unlimited copying license costs districts $500 per school in districts with two or more high schools. (Districts with only one high school get a special price.) According to Mark Friedland, a Krell spokesman, more than

100 districts have purchased the three-year license. The company has deemed the program so successful that it has extended it to many of its educational programs.

Occupying the middle ground are publishers that extend "state's rights" to educational institutions. The Minnesota Department of Education recently purchased such rights to InfoConnect, a telecommunications program from Grolier, and to Grade Point, a grade-book program from Paul Rogne Associates. In both instances, the licenses permit the Department of Education to distribute unlimited copies to districts throughout the state. For that right, the state pays up to $100,000, according to Harold MacDermot, technical curriculum specialist.

Then there's the old-fashioned site license, such as the one the Minnesota Department of Education bought for LogoWriter from Logo Computer Systems, Inc. Under this plan, the state buys a copy for each site, where copies are then made for individual use.

MASS MODEMS

What could a high school with 210 students possibly do with 379 modems? Keep 150 of them and pass the rest around to other schools to set up a communications network. That's what the new Illinois Mathematics and Science Academy (IMSA) is doing with just that many modems, donated to the school by US-Robotics, Inc., of Skokie, Illinois. The modems are worth $63,000, according to Mark Smith of USRobotics.

Although 150 modems may still seem like a great many for such a small student body, those 210 students are all sophomores who comprise the first class to enter this "high-tech high," so the student population will grow. This high school is for gifted students, who, along with faculty members, will use the modems to do research on-line. The schools that receive the balance of the modems will be able to call up IMSA and share the school's computer resources.

THE TEACHER'S IDEA & INFO EXCHANGE

If you're a teacher who uses AppleWorks, take note. There's a new club, of sorts, intended for people just like you. The Teacher's Idea and Information Exchange provides a way for teachers to trade templates, tips, files, and notes— all via AppleWorks files. Here's how it works: To become a member, write to TIIE to request a disk of AppleWorks files, the fee for which is $5, plus $1 for postage. If you contribute files, you get a $2 credit toward the disk fee. At this writing TIIE had 300 members and was adding about 10 new members each day. For further information, write to The Teacher's Idea & Information Exchange, c/o James Carlisle, Rd. 2, Box 754, Cobleskill, NY 12043.

RANDOM SELECTION

Davidson & Associates, Inc., of Torrance, California, has a novel approach to deciding to which schools it will donate its educational software: It picks names out of a hat. The company includes coupons in its newsletter, *The Computer Classroom*, which educators can fill out and return to Davidson.

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ILLUSTRATIONS BY ROBERT PIZZO

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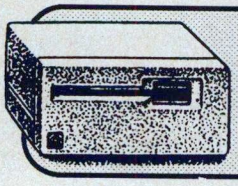

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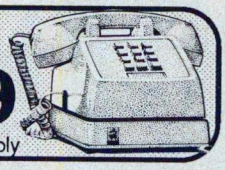

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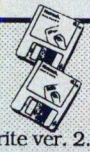

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CIRCLE 103 ON READER SERVICE CARD

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grams that fit its needs. By the end of 1986, Davidson had given away $35,000 worth of software to scores of recipients. The software donation program will continue on into 1987, according to spokeswoman Ingrid Matthews.

For further information, schools should call Davidson & Associates at (213) 534-4070.

A SLIGHTLY NEW APPLE II

Apple has made a few minor modifications to the Apple IIe motherboard that developers will probably want to know about. For starters, instead of using eight 64K × 1 bit RAM chips, Apple is now using four 64K × 4 bit chips for the IIe's 64K of RAM. In addition, Apple has combined two 8K × 8 ROM chips into a single 16K × 8 chip. Apple says, however, that RAM and ROM addressing remain the same.

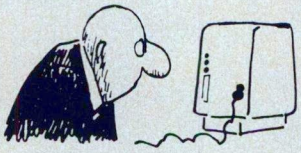
Last but not least, Apple has now hard-wired the single-wire Shift key modification, moving away from the previous jumper-pad arrangement. This change lets mouse-based programs detect a shift-click.

Also, software that uses the single-wire Shift key modification can work on the Apple IIe. One caveat: Programmers should make sure their software never requires users to have both Switch 2 and the Shift key active simultaneously because it causes a short circuit that shuts down the power supply.

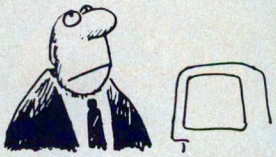
BY DEDINI

LAUGHTRACK

When things go wrong, where to look . . .



Look in the back.



Look at the ceiling.

Look at your shoes.

Look in your wallet.

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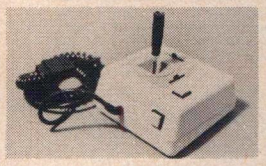

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COOLING FAN
for Apple II, II+ and *IIe*

APF-1. . . . . $29.95

SWITCHING POWER SUPPLY
for Apple II, II+ and *IIe*

KHP4007. . . . $34.95

PARALLEL PRINTER INTERFACE
for Apple *IIc*

MW-100. . . . . $49.95

12" MONOCHROME GREEN MONITOR
for Apple II, II+ and *IIe*

AMON. $99.95

80-COLUMN CARD
for Apple II, II+ and *IIe*

Smarterm II..$139.95

1 MBYTE RAM CARD
for Apple II, II+ and *IIe*

BIGBOARD-256K $199.95
BIGBOARD-512K $249.95
BIGBOARD-1M $299.95

COMPUTER POWER PROTECTION

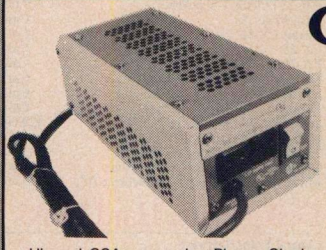
Front View IBAR-8-15 Internal View

IBAR-4-6 ISOBLOK IBAR-2-6

TRIPPLITE ISOBAR® SURGE SUPPRESSORS
Protect Your Apple!

- Transient Response Time: Less than 5ns
- High Voltage Spike Protection: Handles up to 13,000 amp spikes
- Input: 125VAC, 15A
- Standard 3-prong plug
- Load handling: 1875 watts maximum
- Total load: 15 amps per socket

Part No.	No. of Outlets	Length of Cord	L x H x D	On/Off Switch	On/Off Light	Circuit Breaker	Weight	Price
ISOBLOK	2	Direct Plug-in	2⅜x4⅛x2½	No	Yes	No	1 lb.	$29.95
IBAR-2-6	2	6 Foot	5½x2½x3½	Yes	Yes	No	2 lbs.	$39.95
IBAR-4-6	4	6 Foot	6½x2½x3½	Yes	Yes	15 Amp	2½ lbs.	$54.95
IBAR-8-15	8	12 Foot	10½x2½x3½	Yes	Yes	15 Amp	4 lbs.	$74.95



GS SOLA ELECTRIC POWER CONDITIONER

The SOLA Model No. 63-13-114 Micro/Mini Computer Regulator is a needed insurance against surges, dips, brownouts, plus isolation from transverse and common mode noise. Utilizing the SOLA Regulator will cut down on unnecessary and costly service calls and protect your computer investment.

• UL and CSA approvals • Phase: Single • Input Voltage: 95-130 VAC (60Hz) • Output Voltage: 120 VAC (60Hz) 140 Watts • Output Voltage Regulation: ±3% for an input line variation of ±15% • Output Harmonic Distortion: Less than 3% total rms content at full load • Efficiency: 85% @ full load • No loss of output for line loss of 3msec • Common mode noise rejection exceeds 120dB • Transverse mode noise rejection exceeds 60dB • Size: 5⅝"L x 5½"H x 11¾"D • Weight: 20 lbs.

SALE! LIMITED QUANTITY!

Part No.	Output V.A. Rating	Regular	Price
SOLA	140	~~$236.00~~	$99.95

5¼" DISK DRIVE
for Apple II, II+ and *IIe*

• Direct drive • 143K formatted • 35 tracks • Super quiet • Works with Apple Controllers or other compatibles (JE875) below • Complete with connector – just plug into your controller • Size: 5¾"W x 1⅝"H x 8"D • Weight: 4 lbs.

ADD-12. . . . $99.95

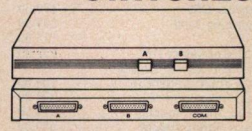
JE875 (Controller Card) $49.95

5¼" DISK DRIVE
for Apple *IIc*

• Same specs as ADD-12 (above) except no controller necessary.

ADD-IIc. . . . $109.95

DATA SPEC DATA SWITCHES



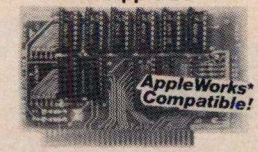
SERIAL 2-WAY
AB-25. . . . . $49.95

SERIAL 3-WAY
ABC-25. . . . $74.95

PARALLEL 2-WAY
AB-36. . . . . $66.95

PARALLEL 3-WAY
ABC-36. . . . $94.95

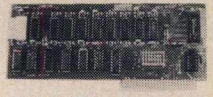
EXTENDED 80-COLUMN CARD
for Apple *IIe*



The **JE864** is an extended 80-column/64K RAM Card. This effectively doubles the amount of data that your Apple *IIe* can display as well as its memory capacity • Ideal for word processing • Ultra High Resolution Graphics capability • Complete with instructions

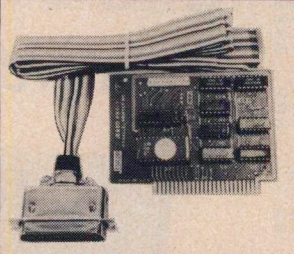
JE864 . . . ***SALE!*** . . . $59.95

16K RAM CARD



The **JE860 RAM Card** (Language Card) allows the Apple II and II+ computers to expand from 48K to 64K. Complete with instructions.

JE860. . . . . $39.95



PARALLEL PRINTER CARD
for Apple II, II+ and *IIe*

• Intelligent interface to most of today's dot matrix graphics printers • Centronics standard • Advanced text printing features

JE880 Parallel Printer Card. $49.95
JE883 64K Buffer for JE880. . . . . $69.95

$20.00 Minimum Order - U.S. Funds Only
CA Residents Add 6%, 6½% or 7% Sales Tax
Shipping - Add 5% plus $1.50 Insurance
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ZOOM 300 BAUD MODEM
for Apple II, II+ and *IIe*

• Auto-dial/Auto-answer • Hayes compatible • Includes call progress monitor, speaker, ZOOM Communications software and manual • Made in U.S.A.

ZM300. . . . . $89.95

PROMETHEUS 1200/300 BAUD MODEM
for Apple II, II+, *IIe* & II GS

• **NEW, single card version** • Built-in software in ROM • Comes with ProCom-A disk-based communications software • Hayes compatible • Compatible with ProDOS • Auto-dial/Auto-answer • Auto redial on busy • Built-in speaker and volume control • 2 phone jacks with exclusion switching • 2-year warranty

PM1200A-2 $199.95

3/87

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NewsPlus

MONITOR IIGS PROBLEM

If you have a Monitor IIGS, it may have a potential safety problem. Not to worry, though—it does not affect the functionality of the monitor and is a potential problem only when the case is opened for repair. Monitor IIGSs with serial numbers from 0000001 to 0291203 have conductors in the power cords that are not in the proper sequence. You can take your monitor for repair at your authorized Apple dealer, who will replace the power cord for free—and while you're there, check out the new IIGS programs!

HAVE YOU HEARD THE ONE ABOUT...?

Brøderbund Software of San Rafael, California, wants to hear about your friends and family members who have unusual methods of managing their personal finances. Does Uncle Ned stash his savings under the mattress? Or do you know someone who files receipts and payment stubs in old issues of *U.S News and World Report*? Brøderbund is soliciting such stories to promote its new financial-management software, On Balance, while tying this promotion to the tax season.

Send your anecdotes to Brøderbund by April 1, and you might be the grand-prize winner, who will receive $1000 worth of Brøderbund software. Second prize will be $500 worth of software, and semifinalists will receive copies of On Balance. Brøderbund will announce the winners on April 15.

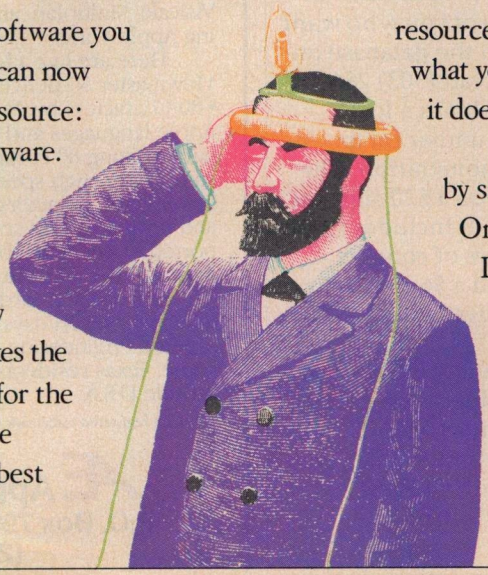
CONTEST TIME

Scholastic Software is sponsoring its third annual Story Tree writing contest. Open to students in grades 4–9, the contest requires that they use Scholastic's Story Tree program to write the stories they submit. The judges will review stories in grades 4–6 and 7–9 separately and award an Apple computer to the author of the best story in each group. Honorable mentions will receive $100 each. Deadline for submissions is April 30.

If you feel like a lost soul when it comes to music software, get the bible.

Almost every bit of music software you could possibly want or need can now be found in a unique single source: Coda, the bible of music software.

Detailing over 500 items which range from software to accessories to books, Coda is a remarkably user-friendly catalog that takes the confusion out of searching for the right music software. It's the computer-using musician's best resource today. In fact, if you can't find what you need in Coda, chances are it doesn't exist.



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All major credit cards accepted.
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CIRCLE 123 ON READER SERVICE CARD

NewsPlus

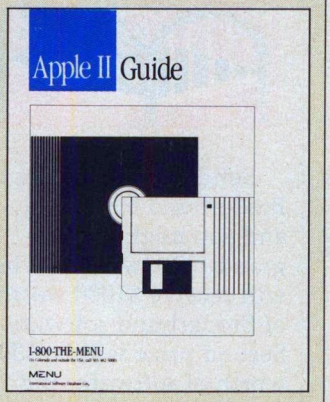
NEW GENIE FORUM

GEnie, a commercial on-line service known for its reasonable rates, recently started a forum for Apple II developers, straightforwardly titled the Apple II Developer's and Programmer's Roundtable. According to sysop Michael Fischer, you don't have to be a professional developer to participate. Both 8- and 16-bit architectures, and all operating systems, will be open for discussion, he says. Among the forum's offerings are Apple II technical notes, provided by Apple itself; portions of the AppleWorks source code, from AppleWorks' author, Rupert (Bob) Lissner; and open discussions of programming techniques. Fischer says he also hopes to create a job board as well as a section in which developers can recruit beta testers. To reach the GEnie forum, type M 530.

THE APPLE II GUIDE

MENU, a Colorado-based company, did such a good job of maintaining a database of Apple products that Apple worked with the firm to design and distribute the *Mac Guide*. Prior to the introduction of the IIGS, Apple asked MENU to prepare an *Apple II Guide*. The latter guide, which contains more than 7800 product listings, is arranged by subject categories and provides product name, price, vendor, system requirements, and a brief description. The software listed has had current availablity verified and includes IIGS products. You may purchase the guide for $9.95 from Apple dealers or directly from MENU. Expect to see a semiannual or quarterly update (priced separately). Although the guide may not have the most recent IIGS software, you can call the toll-free number for the latest listings: (800) THE-MENU.

The Apple II Guide *contains more than 7800 product listings.*

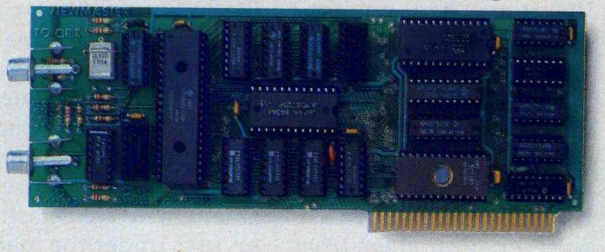


Those of you who want to search the database on-line can call (303) 286-0222 to obtain a local phone number for an on-line demonstration. The service has a $20 sign-up fee (which includes three free hours of connect time) and a $6-per-hour connect fee (300 or 1200 bps).

To have your IIGS programs added to the database, contact MENU, ATTN: Vendor Relations, 1520 South College Avenue, Ft. Collins, CO 80524.

Viewmaster 80

Now run AppleWorks™ on your II+ *and* keep full 80 column compatibility!



	BUILT-IN SOFTSWITCH	SHIFT KEY SUPPORT	LOW POWER DESIGN	80 COLUMN HOME	7 x 9 DOT MATRIX	LIGHT PEN INPUTS	40 COLUMN OVERRIDE	INVERSE CHARACTERS	
VIEWMASTER 80	✓	✓	✓	✓	✓	✓	✓	✓	
SUPRTERM		✓					✓	✓	
WIZARD 80					✓		✓	✓	
VISION 80	✓	✓			✓				
OMNIVISION		✓					✓	✓	
VIEWMAX 80	✓	✓			✓			✓	
SMARTERM	✓	✓				✓	✓		
VIDEOTERM		✓	✓		✓	✓		✓	

One look at the chart will give you some of the reasons there's only one smart choice in 80 column cards for your Apple. But the real secret to Viewmaster 80's success is something even better: Total compatibility.

Each Viewmaster 80 includes our powerful AppleWorks expand software, allowing AppleWorks to run on the II+ with only 64K (or more) memory. (We recommend the RamFactor memory card, but any compatible Apple memory card will work.) The software provides our full range of AppleWorks enhancements, including expanded records, word processor, multi-disk saving, time and date display on screen with any PRO-DOS clock, and more!

The Viewmaster 80 works with all 80 column applications, including DOS 3.3, PRO-DOS, CP/M, Pascal, WordStar, Format II, Applewriter II, dBase II, Visicalc, Multiplan, and *hundreds* of others — including AppleWorks.

Here are just a few of the powerful features the Viewmaster 80 delivers for a great price ($149):
• 80 Characters by 24 lines • Fully compatible with all Apple languages and software • Highest compatibility with existing 80 column software • Very low power consumption • High speed (18 MHZ) scroll rate • Upper and lower case characters and true descenders, both inverse and normal; all on-screen editing functions are supported • User-definable cursor shape • Compatible with Apple II, II+ and IIe • Five-year warranty

Call today to order or for more information, 9 a.m. to 11 p.m. seven days, or send check or money order to Applied Engineering. MasterCard, VISA and C.O.D. welcome. Texas residents add 5⅛% sales tax. Add $10.00 outside U.S.A.

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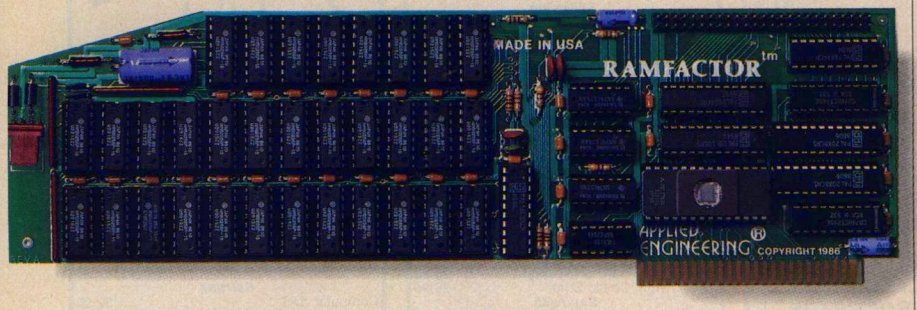
Here's more you can do with the new Apple II.

RamFactor™

The Highest Performance, Speed and Software Compatibility of Any Slot 1-7 Memory Card for the Apple II+, IIe or IIGS.

Now anyone with an Apple II+, Franklin, Laser 128, Apple IIe or IIGS preferring to use slots 1 through 7 can now enjoy the speed and performance that they've been waiting for.

With RamFactor, you'll be able to instantly add another 256K, 512K, or a full 1 MEG on the main board and up to 16 MEG with additional piggyback card. And since virtually all software is automatically compatible with RamFactor, you'll immediately be able to load programs into RamFactor for instantaneous access to information. You'll also be able to store more data for larger word processing documents, bigger data bases, and expanded spreadsheets. And with the battery back-up option you can switch on your Apple and any of your favorite software will be up and running in less than 1 second!



Very Compatible

All the leading software is already compatible with RamFactor. Programs like AppleWorks, Pinpoint, BPI, Managing Your Money, Dollars and Sense, SuperCalc 3A, PFS, MouseWrite, MouseDesk, MouseCalc, Sensible Speller, Applewriter IIe, Business Works, ReportWorks, Catalyst 3.0 and more. And RamFactor is fully ProDos, DOS 3.3, Pascal 1.3 and CP/M compatible. In fact, no other slot 1-7 memory card is more compatible with commercial software.

AppleWorks Power

There are other slot 1-7 cards that give AppleWorks a larger desktop, but that's the end of their story. But RamFactor is the only slot 1-7 card that increases AppleWorks internal memory limits, increasing the maximum number of records in the database and lines permitted in the word processor, and RamFactor is the only standard slot card that will automatically load all of AppleWorks into RAM dramatically increasing speed and eliminating the time required to access the program disk, it will even display the time and date on the AppleWorks screen with any ProDos clock. RamFactor will automatically segment large files so they can be saved on 5¼", 3½", and hard disks. All this performance is available to anyone with an Apple IIe, IIGS *or* II+ with an 80 column card. RamFactor, no other standard slot card comes close to enhancing AppleWorks so much.

True 65C816 16 Bit Power

RamFactor has a built-in 65C816 CPU port for direct connection to our IIe 65C816 card for linearly addressing up to 16 MEG for the most powerful 16 bit applications. (II+ 65C816 card under development.)

Powerful Program Switcher

With RamFactor, you can organize memory into multiple work areas and switch between them. Each work area can contain different programs and even different operating systems. Now you can switch from one program to another or even switch from AppleWorks to DOS 3.3 to CP/M to Pascal to ProDos in under a second. And with our Battery back-up option, you can have permanent storage for up to 20 years.

Quality and Support of the Industry Leader

RamFactor is from Applied Engineering, the largest, most well supported manufacturer of Apple peripherals and the inventor of large RAM cards for the Apple. With our 5 year no hassle warranty and outstanding technical support, you're assured of the most trouble free product you can buy.

Features:

- Up to 16 MEG total memory, 256K to 1 MEG on main board. Up to 16 MEG with additional memory on piggyback card.
- Fully Apple II Memory Expansion compatible
- Compatible with Apple IIe, II+, IIGS, Franklin and Laser 128
- Battery back-up option allows you to turn on your Apple and run your favorite programs in less than 1 second!
- Automatically recognized by ProDos, DOS 3.3, Pascal and standard CP/M
- Built-in RamDrive™ software (a true RAM disk not disk caching)
- Systems are directly bootable from RamFactor if desired
- Built-in linear addressing 16 bit co-processor port
- Built-in self diagnostic software
- Automatic expansion with AppleWorks 1.3 or later
- Allows Apple II+ and IIe to run your AppleWorks without buying additional software
- Accelerates AppleWorks
- Displays time and date on the AppleWorks screen with any ProDos clock
- Fits any I/O slot except slot 3
- Fully socketed and user upgradeable
- Much, much more

RamFactor with 256K	**$239**
RamFactor with 512K	**$289**
RamFactor with 1 MEG	**$389**
RamFactor with 2-16 MEG	**CALL**
Battery Back-up Option	**$179**
65C816 16 Bit Card	**$159**

Order RamFactor today . . . with 15 day money back guarantee and our "no hassle" five year warranty. *See* your dealer *or call* (214) 241-6060, 9 a.m. to 11 p.m., 7 days, *or send* check or money order to Applied Engineering. MasterCard, Visa and C.O.D. welcome. Texas residents add 5⅛% sales tax. Add $10.00 if outside U.S.A.

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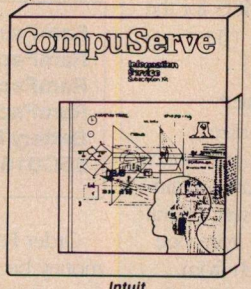

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Roger Wagner

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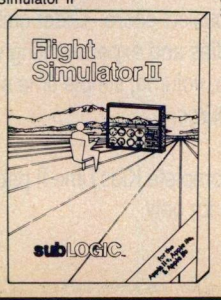

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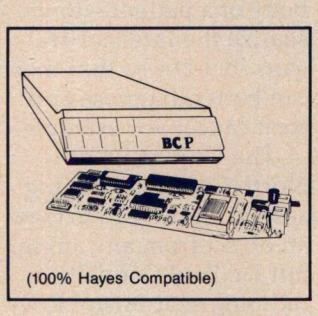

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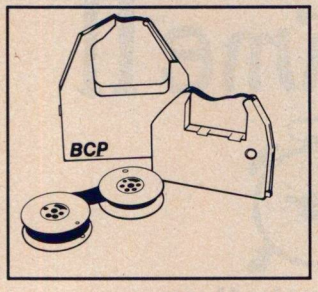

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3-D IMAGES

Scientists at the University of North Carolina have a new computerized system, called Pixel-planes, for producing three-dimensional pictures on a video screen. The system is far more sophisticated and powerful than any other imaging system, except for flight simulators costing millions of dollars. By moving two joysticks, the operator can reduce an on-screen image to the size of a pinhead or enlarge it so much that tiny details fill the entire screen. You can rotate an image to see it from any angle, create lifelike shadows, and change the color of any object on the screen with the push of a button. The Pixel-plane system, capable of 12 million operations per second, contains more than 2000 computer chips and is about the size of a refrigerator. The scientists are particularly interested in medical imaging, to give physicians a tool that allows them to look inside the body of a patient—to visualize the internal organs in 3-D—so that they can better diagnose and treat cancer, for example.

The University of North Carolina imaging system allows you to view an object from any angle, but Dr. Paul Goddard, a radiologist at Bristol Royal Infirmary in England, has found a more limited, but nonetheless effective way of looking at his patients. He uses an imaging system, called Tritec, to plot the location of tumors and plan the best surgical routes. The system transforms a sequence of cross-sectional scans into a 3-D image by layering films of dot-matrix printouts of the cross-sectional scans. These films are then stacked in the proper sequence above a light box, providing a transparent 3-D model of a body.

The Pixel-plane system is capable of 12 million operations per second.

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KidsTime™ II is an educational package for young children that emphasizes creativity, exploration, and skill development. KidsTime II contains two educational programs, **ABKey™** and **KidsNotes™**, which were derived from the popular and successful Macintosh™ KidsTime programs. Your children ages 3 to 10 will enjoy using both programs and older children will also enjoy KidsNotes. KidsTime II is an excellent example of the high quality sound and graphics available on the Apple IIGS computer.

ABKey

ABKey teaches children to recognize letters of the alphabet and develop basic keyboard skills. The program includes many levels of challenge and difficulty. Pictures, letters, and synthesized sounds are used in this program. This program is made even more exciting with the use of high resolution color graphics and sound.

KidsNotes

KidsNotes encourages children to have a positive and creative experience with music while learning the basics of musical notation. This introductory music program allows children to explore many aspects of music. Younger children can enjoy playing pre-recorded melodies. They also learn to associate the notes played with the on-screen piano keyboard and musical score. Older children will enjoy composing simple melodies and experimenting with rhythm, pitch, duration, tempo, volume, simple time signatures, and simple key signatures.

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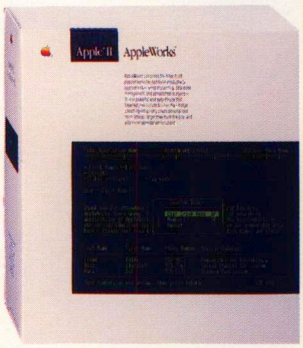

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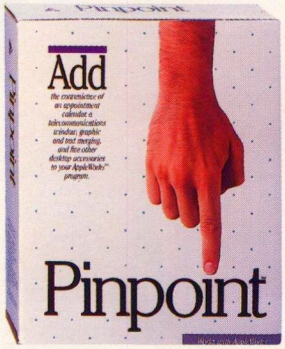

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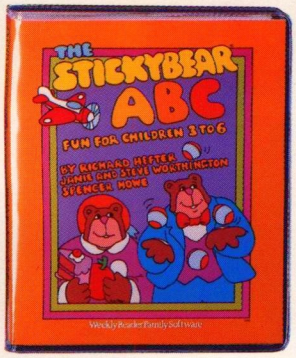

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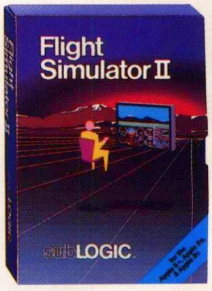

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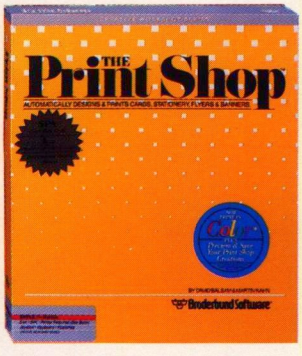

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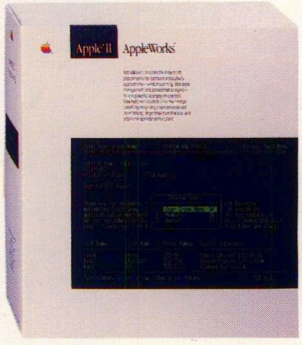

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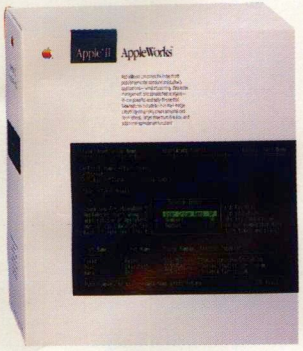

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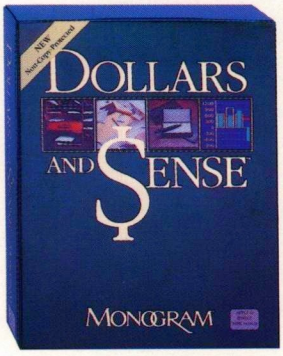

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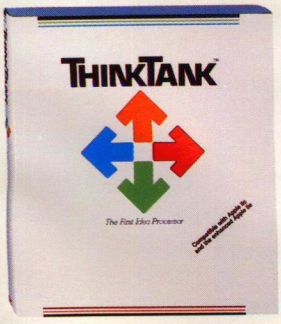

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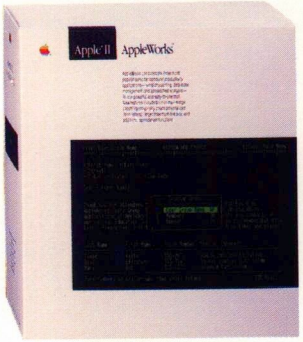

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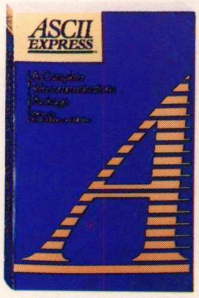

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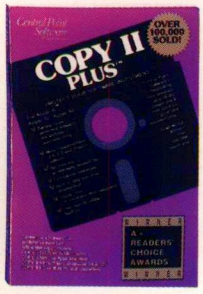

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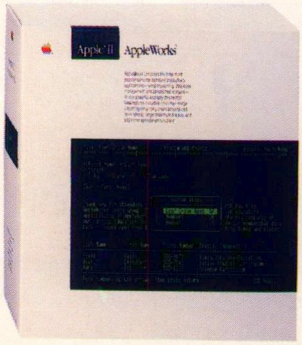

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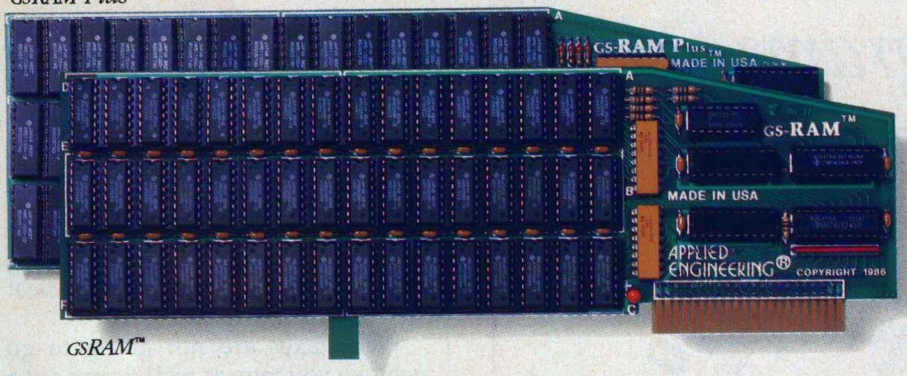

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Remember the 16K cards for the II+ and the 64K cards for the IIe? At the time, that much memory seemed like a lot. But when the owners of these memory cards came to us for more memory, many had to throw away their smaller Apple memory cards or try to sell them. Most of our customers told us that had they known about Applied Engineering's larger memory cards when they bought their Apple, they would have purchased them at the same time.

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- Expands AppleWorks internal limits
- Built-in Hi-Res self-diagnostic software
- 5 year hassle free warranty (Apple has a 90 day warranty)
- Made in USA

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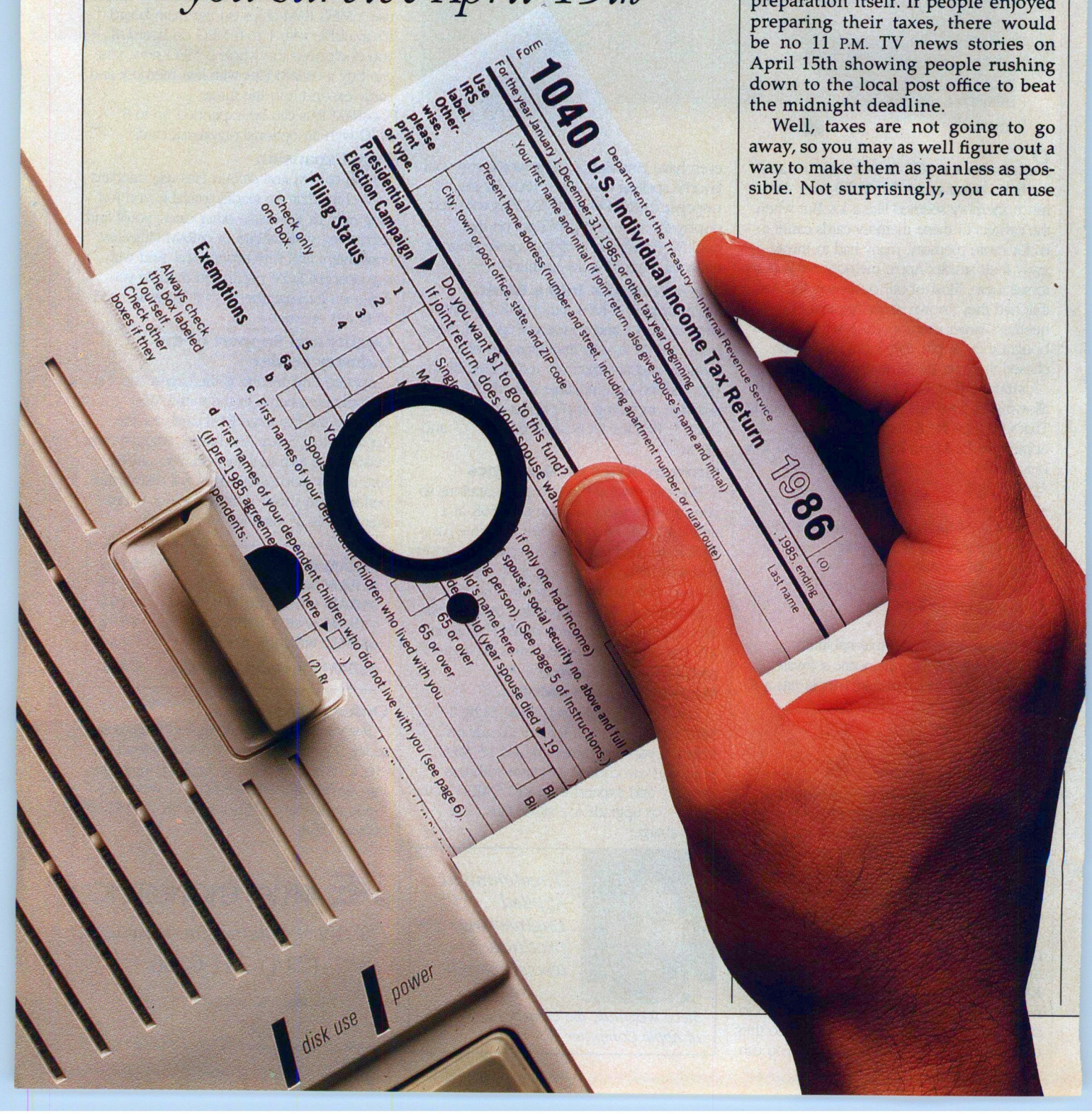
COVER STORY *BY STEVE MANN*

MAKING TAXES

Apple II programs to help you survive April 15th

Let's face it, just about everyone dreads taxes. The worst of it, of course, is that you must fork over your hard-earned dollars to the Feds. Then there's the specter of tax preparation itself. If people enjoyed preparing their taxes, there would be no 11 P.M. TV news stories on April 15th showing people rushing down to the local post office to beat the midnight deadline.

Well, taxes are not going to go away, so you may as well figure out a way to make them as painless as possible. Not surprisingly, you can use



LESS TAXING

your personal computer to hasten tax preparation, and numerous tax-preparation programs are available for the Apple II. If you also use a personal-finance program to manage your money, you might even be able to generate your tax return from the financial data that you accumulate throughout the year (see "The Rest of the Year," which accompanies this article). There are also programs that help you estimate your tax liability for one or more future years (in a process called tax planning).

Because April 15th is approaching, we'll look primarily at tax-preparation software. Since this article was prepared a few months ago, most of these reviews are based on 1985 versions of the programs, with additions based on vendor comments. If we waited for the 1986 versions, we wouldn't be able to bring you this information until much later in the year. If a particular feature of a product, such as a certain form or calculation, is critical to you, contact the vendor to verify the availability of that feature.

Preparing for April 15th

Once you're familiar with the IRS forms and calculations, tax preparation itself is not really that difficult. The problems are getting to know the tax rules and compiling your financial records. With the right software, you can bypass most of the first requirement. Unfortunately, there's no way to skip the record-keeping problem—you just have to do it.

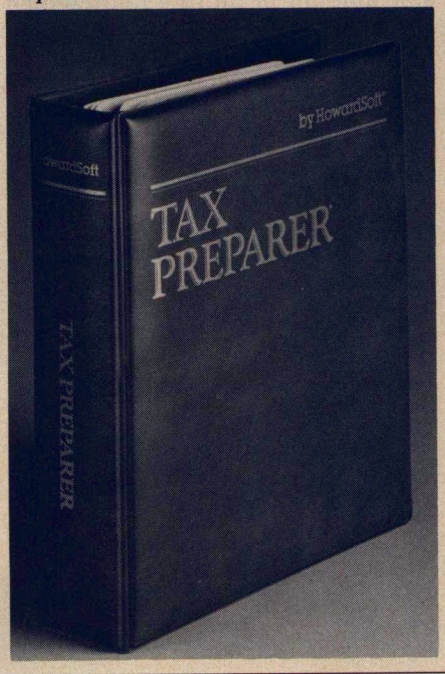
The secret to minimizing April 15th trauma is to keep your tax records organized throughout the year so that all you have to do is plug the numbers into the forms (or program), write the check, and mail the return to the IRS. Tax-record keeping is like cleaning closets—it's easy to put off until you have no other choice.

Whether you use the shoebox approach or the organize-as-you-go method, you have to collect all your records and organize them in the appropriate tax categories, such as income, medical expenses, and the like. The problem is knowing what belongs where. By spending an hour or two reading the IRS booklet that comes with your tax forms, you should be able to get a handle on the relevant categories. Once you've done that and organized your records, tax preparation with software should be a snap—literally a 30-minute job with the right program.

Tax-Preparation Software

The rest of this article contains reviews of six products. Four are stand-alone programs, and two are AppleWorks templates. Each has its own strengths and weaknesses. To test them, we calculated a few sample returns that used many of the IRS forms and schedules. Notice that none of the programs can generate a 1040 form. That's because meeting the standards the IRS stipulates for this form is difficult (it requires the taxpayer's signature and must therefore be of high quality). Some programs let you print data onto a preprinted 1040 form, though.

Both professional tax preparers and individuals can use HowardSoft's Tax Preparer.



Tax Preparer

Tax Preparer is the only product I reviewed that is billed as being for both professional tax preparers and individuals. Accordingly, it has one of the most complete set of forms and schedules of any of the products I looked at. Because it can be for professional use, it includes such features as cover-letter and bill generation, unnecessary for most individuals.

Figure 1: The data-entry screens from HowardSoft's Tax Preparer resemble the official IRS forms.

```
Form 1040  -  Main Form

**FILING  STATUS*********
     Type 1=S,2=MFJ,3=MFS,4=HH,5=QW.........
     Spouse name if Mrd Fing Sep(3)
     Child name if Head of Hshld(4)
     Yr spouse died if Qlfg Widw(5)
     6a. Exemption for yourself....? Yes
         65 or over exemp for you..?  No
         Blind exemption  for you..?  No
     6b. Exemption for spouse......?  No
         65 or ovr exemp for spouse?  No
         Blind exemption for spouse?  No
     6ab.# of exemptions on 6a & 6b.....6ab.  1
     6c. Res dep children (itemize).....6c.   0
     6d. Nonres dep child (itemize).....6d.   0
         Pre-1985 custody agreement?  No
     6e. Other dependents (itemize).....6e.   0
     6f. Total # of exemp's claimed.....6f.   1
```

This program is the most complete of the six. It has more than 300 pages of excellent documentation, including a tutorial, an operations guide, a tax-forms guide, a glossary, and a complete index. It automatically adapts to take advantage of an 80-column display and extra memory, and it has built-in disk utilities for managing multiple returns and formatting disks. It also lets you configure the program for different disk and printer combinations.

Each of the Tax Preparer's data-entry screens (see figure 1) is similar to the IRS forms, which makes it difficult to get lost while entering your tax-return data. It provides good printing control, letting you print one or more forms at a time, and prints IRS-approved forms for all but the 1040 form. You can print onto a preprinted 1040, however, or print a facsimile and transfer the

PHOTOGRAPHY BY DAVID FISCHER

numbers to the 1040. Another alternative is to photocopy the facsimile, using a 1040 transparent overlay (not provided).

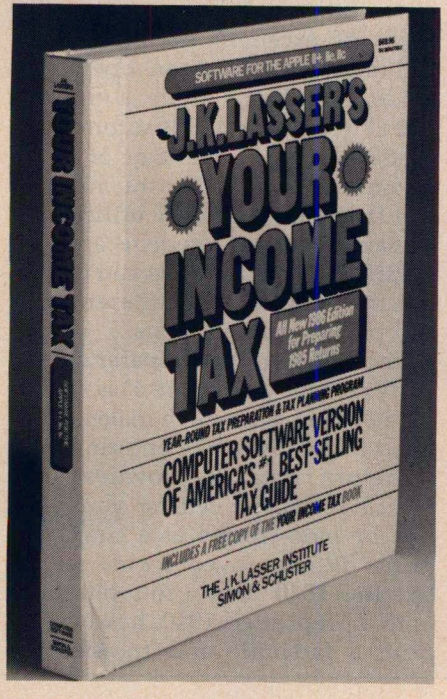
Tax Preparer is the Cadillac of the bunch (and it's priced accordingly). Its only problem is the variety of special function keys you must use to control the program's operation. You can't just sit down and start using this one—you need to do the tutorial and read the manual's section on the special function keys first.

J.K. Lasser's Your Income Tax

This program is published by the same folks who bring you the book of the same name, arguably the most popular income-tax book. You've probably seen this fire-engine-red and yellow book in your favorite bookstore. The first thing you notice about Your Income Tax is the inconvenient packaging. It's a nonstandard size (for software), with an awkward binding and with the disk and J. K. Lasser book stuffed into a paper bag glued to the inside back cover of the binding. To use the program, you must rip the bag out of the binding.

Packaging aside, however, you'll discover that these income-tax experts aren't necessarily software experts. Your Income Tax does work with as many forms and schedules as Tax Preparer does, but the software is far from elegant. It switches back and forth between 40- and 80-column operation, and it lacks disk utilities. Name and address fields are typically too short, and you can print only one form at a time.

Your Income Tax has some shortcomings, but does allow fast data entry.




```
Your Income Tax  Preparer     Form: Form 1040        Page: 1 of 5   JKL: 24.60
_____________________________________________________________________________
     Send $1 to Presidential Election Campaign Fund? _   Spouse? _
INCOME
  7  Wages, salaries, tips, etc                                        _______
  8  Interest income (Schedule B)                                      _______
  9a Dividends_________,9b Exclusions_________,9c Ln9a less 9b
 10  Refunds of state and local tax                                    _______
 11  Alimony received                                                  _______
 12  Business income(loss) (Schedule C)                                _______
 13  Capital gain(loss) (Schedule D)                                   _______
 14  40% capital gain distributions not on Ln 13                       _______
 15  Other gains(losses) (Form 4797)                                   _______
 16  Fully taxable pensions,IRA & annuities not on Ln 17               _______
 17a Other Pensions, annuities _________, 17b Taxable amount           _______
 18  Rents, royalties, etc (Schedule E)                                _______
 19  Farm income(loss) (Schedule F)                                    _______
 20a Unemployment compensation _________, 20b Taxable amount           _______
 21a Social Security benefits _________, 21b Taxable amount            _______
        Tax-exempt interest_________
 22  Other income(specify type)_____________________________           _______
 23  Total Income (Add Lns 7 through 22)
```

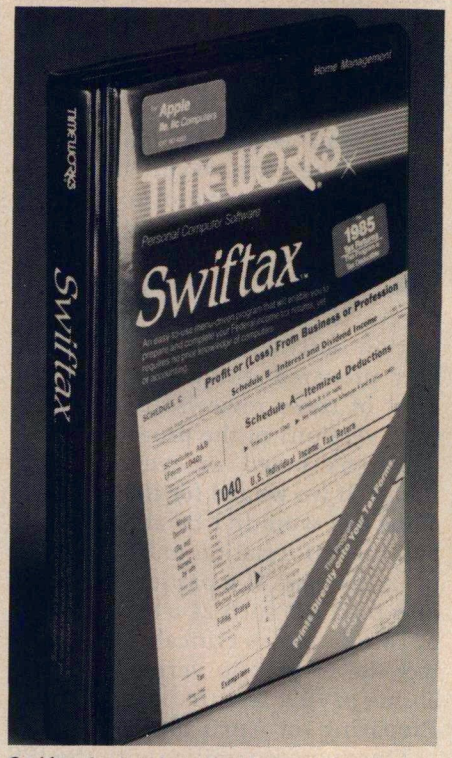
Figure 2: Like Tax Preparer, the data entry screens for J.K. Lasser's Your Income Tax look like the IRS forms.

In addition, none of the printouts are IRS-approved. You have to hand-copy all the results onto the regular IRS forms (the program can print onto a preprinted 1040 form, however). The documentation states that the IRS "does not allow you to submit computer-generated forms and schedules," which is just not true. These types of oversights and shortcomings make for a less-than-exciting product.

On the good side, Your Income Tax allows the fastest data entry of the six reviewed products. You can import data from J.K. Lasser's Your Money Manager, a personal financial-management program. As with Tax Preparer, the data-entry screens (see figure 2) are similar to the IRS forms, making it easy to stay on track when entering financial information. The program also has a reasonable amount of on-line help, which is good, because the second-rate documentation is a sparse 50 pages.

Swiftax

Swiftax is a low-end product compared to Tax Preparer and Your Income Tax. It can prepare fewer forms and schedules, works in the 40-column mode only, and is very simple and straightforward. It's the kind of program you can use in a matter of minutes.



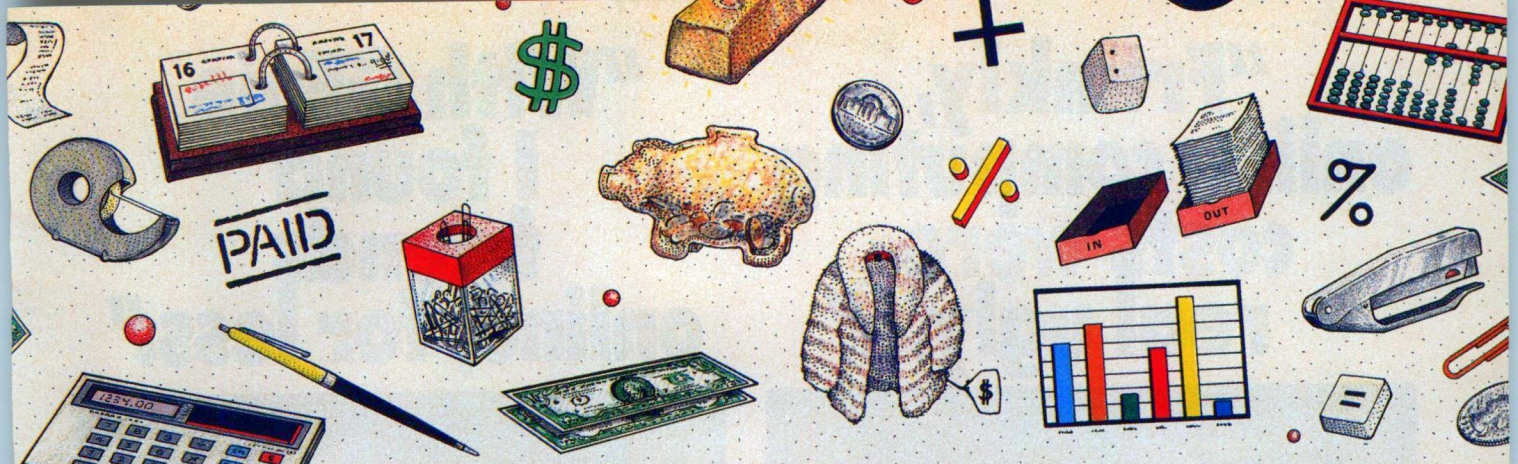
Swiftax is simple and straightforward.

Figure 3: Swiftax offers many helpful hints as you prepare to fill out schedules and forms.

```
S W I F T A X -- SCHEDULE B

You must use Schedule B to report
income from dividends and interest if
you are filing Form 1040 and have done
any of the following:

1) Received over $400 in interest.
2) Received over $400 in dividends.
3) Paid any accrued interest to the
   seller of a bond.
4) Received dividends that were later
   distributed to someone else.
5) Elected to exclude reinvested divi-
   dends from a public utility or non-
   taxable distributions.
6) Had a foreign account, or
7) Were a grantor of, or transferor to,
   a foreign trust.

Based on the above, are you required
to file Schedule B? (Y/N)?
```

Each data-entry screen (see figure 3) has some useful prompts and helpful hints to guide you through the data-entry process. The program prints out a group of reports, cross-referenced to the IRS forms. You must transfer the numbers by hand to the IRS forms, or you can print the data onto preprinted forms. There is also a utility to allow you to format a data disk from within the program.

Swiftax can be a bit confusing at times, despite its simplicity. It breaks the 1040 form into two parts with separate menu items, which may be confusing for novices. Its explanation of charitable contributions on the 1040 forms is also confusing, un-



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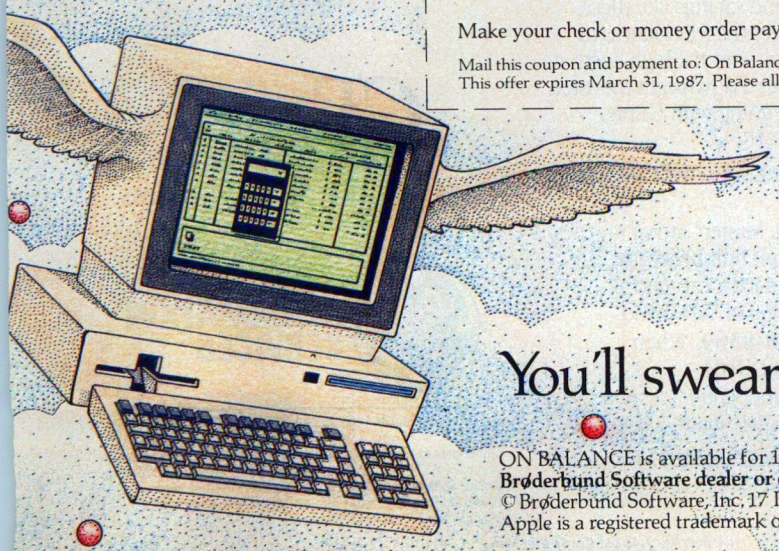

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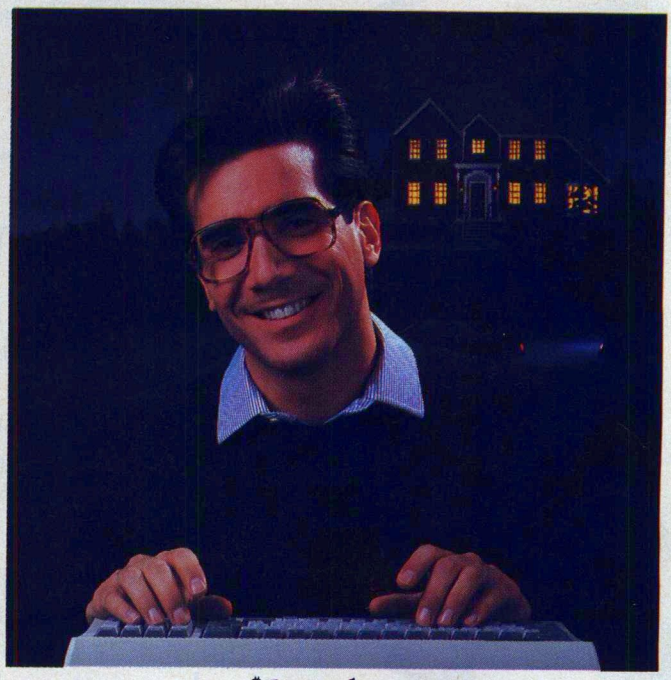

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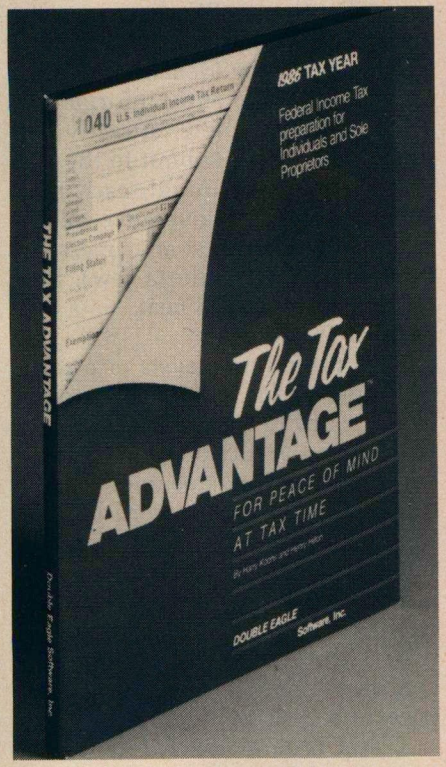
less you know the tax laws regarding this write-off. In many cases, if you make a mistake or select a wrong menu choice, you can't back up and start over again.

The Tax Advantage

Double Eagle's Tax Advantage was published by Haba Systems/Arrays Inc. (formerly Arrays/Continental Software) for the last four years, but Double Eagle recently started publishing it under its own label. (To make matters even more confusing, Haba has recently brought out a new, similarly titled product—Tax Advantage II. Although I was not able to obtain a review copy in time for this article, product manager Gwen Reiger says that Haba's Tax Advantage II is a completely new program that includes many features of the original



The Tax Advantage is well-documented.

Tax Advantage. Haba's program is written in assembly language to make it as fast as possible and comes with transparencies that you can overlay on your printouts and then photocopy to create IRS-approved forms, she says.)

Double Eagle's Tax Advantage is a good-quality low-end product. The design is simple and understandable, the documentation is very good, and the program almost always displays an on-line summary of the available commands. Double Eagle was the only company of the six that had a 1986 version available for review at press time.

The Tax Advantage has two features that, together, make it a good value. First, it can import personal financial data from Haba/Arrays' The Home Accountant. Second, you can enter an itemization list (see figure 4) for any line on any form. Each list includes descriptions and amounts that are automatically totaled. You can effectively enter your tax records throughout the year, using these lists, so that your records are automatically ready for tax preparation at year's end.

This program's printing options are primitive, marring an otherwise good product. It prints out IRS-approved forms, but they're downright ugly. Also, the program doesn't form-feed at the end of most printed pages, causing reports to print across page perforations on continuous-feed paper.

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Epson JX80	4.50	4.00	13.00	12.00	—	—
*Epson MX, FX, RX 80/85, Citizen 10/20	4.50	4.00	5.50	4.50	6.50	6.00
Epson MX, FX, RX 100/185, Citizen 15/25	6.00	5.50	7.00	6.50	—	—
Epson LQ 800	6.00	5.50	7.00	6.50	—	—
Epson LQ 1000	7.00	6.50	—	—	—	—
Epson LX 80/90, Homewriter 10	5.00	4.50	6.00	5.50	7.00	6.50
Epson LQ 1500	5.50	5.00	6.00	5.50	—	—
IBM Proprinter	5.50	5.00	6.50	6.00	—	—
Nakajima/Adler Satellite	5.50	5.00	6.50	6.00	—	—
Nec P2/P6	7.00	6.50	—	—	—	—
Nec P3/P7	8.00	7.50	—	—	—	—
*Okidata 82, 83, 92 & 93/Star SG 10	2.50	2.25	3.50	3.00	4.50	4.00
Okidata 182, 192 & 193	6.50	6.00	7.50	7.00	—	—
Okimate 20 (Thermal)	5.00	4.50	6.00	5.50	—	—
Panasonic 1080, 1090, 1091 & 1092	7.00	6.50	8.00	7.50	—	—
Smith Corona D 100/200, RS DMP 120	6.00	5.50	7.00	6.50	—	—
Star NX 10	7.00	6.50	—	—	—	—
Toshiba 1350, 1351, P1340, P351, 341	6.00	5.50	7.00	6.50	—	—

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Transfer Colors: Red, Yellow, Blue & Black.

MULTI-STRIKE Black Film Ribbons	EACH	6+
Apple LQP, Qume IV	5.00	4.50
Brother HR 15/35, Comrex II	5.50	5.00
Diablo Hi-Type II	3.50	3.00
Epson DX-10, Silver Reed	6.50	6.00
Juki 6100, IBM Selectric II, Tech II	5.00	4.50
Nakajima, Adler Satellite	7.00	6.50
Nec 3500	5.00	4.50
Nec 5500	5.00	4.50
Qume Letterpro 20	4.00	3.50
Ricoh 1600, RS DW-2	5.00	4.50
*Spirit 80, BMC-80, Legend 880, 808, 1080, 1380	6.00	5.50

*Available in Red, Blue & Brown, (Add $1.00 Each)

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SSDD or DSDD ..... **.69 Each** 20 Pack of Labels & Sleeves **$2.20**

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*Not included in Rainbow Pack.

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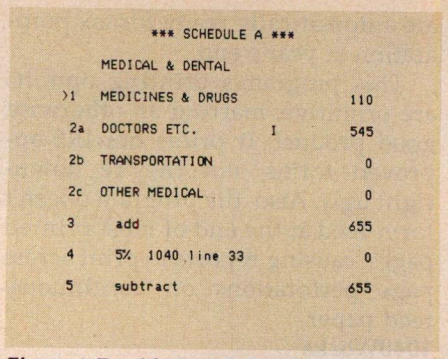
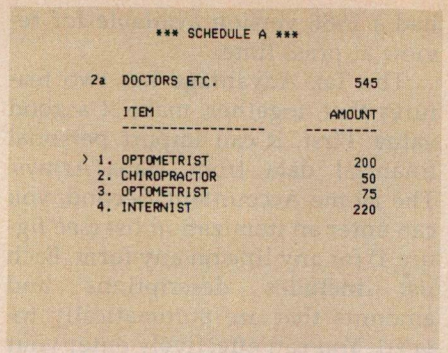
CIRCLE 202 ON READER SERVICE CARD



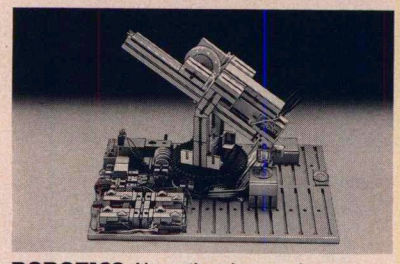
```
*** SCHEDULE A ***

MEDICAL & DENTAL

>1  MEDICINES & DRUGS                 110
 2a DOCTORS ETC.          I           545
 2b TRANSPORTATION                      0
 2c OTHER MEDICAL                       0
 3    add                             655
 4    5%  1040 line 33                  0
 5    subtract                        655
```



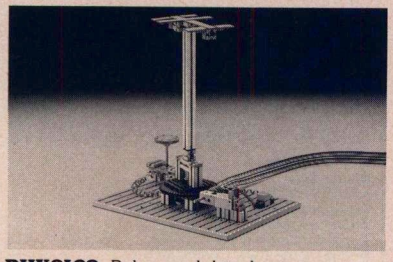
```
*** SCHEDULE A ***

 2a DOCTORS ETC.                      545

    ITEM                          AMOUNT
    ------------------          ---------

> 1. OPTOMETRIST                     200
  2. CHIROPRACTOR                     50
  3. OPTOMETRIST                      75
  4. INTERNIST                       220
```

Figure 4: Double Eagle's Tax Advantage lets you record how your expenses are itemized. The "I" after "DOCTORS ETC." (left) indicates that you recorded how this expense is itemized.

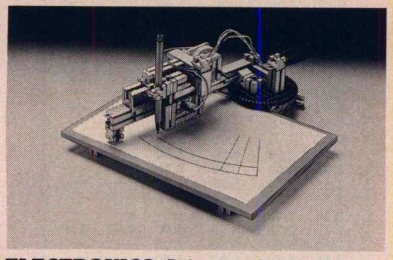
Man and Machine.



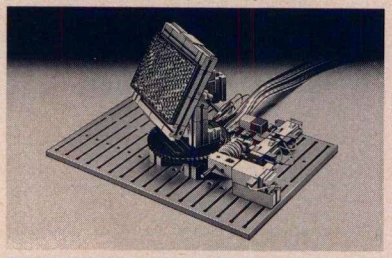
ROBOTICS. Versatile robot can be programmed to repeat various tasks.



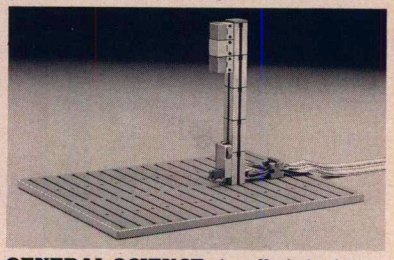
PHYSICS. Pulse-modulated antenna designed to rotate to precise positions.



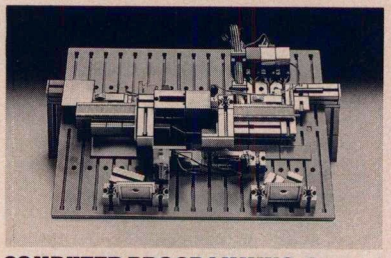
ELECTRONICS. Polar coordinate plotter graphically displays computer calculations.



COMPUTER LITERACY. Solar cell tracking based upon spherical trigonometry.



GENERAL SCIENCE. A traffic light demonstrates basic input/output operations.



COMPUTER PROGRAMMING. System sorts objects according to length.

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CIRCLE 149 ON READER SERVICE CARD

it's with AppleWorks or with a separate spreadsheet program, and 1040-Works has a few problems because it is an AppleWorks template. Because of memory constraints (both AppleWorks and the template are in memory together), a complete return comprises several templates—you have to cut a portion of one template and paste it into a second to complete an accurate return. Third, it prints only one page of a form at a time, which is a bit inconvenient. Finally, it doesn't calculate your tax liability for you—you have to look up the number in the IRS tax tables.

On the other hand, each form fits into the display screen horizontally (see figure 5), so you don't have to move the cursor much to enter all your information. It prints IRS-approved forms for all but the 1040 form. Finally, 1040Works is quite inexpensive, a good bargain.

Prompts embedded in each form tell you where to enter information, so to get a complete, attractive return that you can submit to the IRS, you have to go through each form and make sure you remove all the extraneous prompts and messages (the forms have quite a few). Still, the price is tough to beat.

Federal Tax Forms

This program consists of a series of AppleWorks templates, one per form. They're logically arranged, with clean instructions embedded in each template (the documentation is only a brief four-page word-processing file). Because the forms are separate templates, they are not automatically linked in any way. You have to enter some of the same information two or three times, increasing your chances of making elusive data-entry errors.

Using Federal Tax Forms is similar to working with 1040Works, although one big difference makes the former more difficult to use. Each data-entry form (see figure 6) looks almost exactly like the analogous IRS form, with all explanatory text and parenthetical remarks. That's a good idea, but, unfortunately, each form ends up being several columns wide. To complete your tax return, you have to move back and forth across the columns from each line's description to the cell into which you enter the amount. It's very easy to get lost while moving around inside each template.

Like 1040Works, these templates

THE REST OF THE YEAR

Tax preparation is important in April, but you can do a lot during the rest of the year to simplify tax preparation, minimize your tax liability, and control your personal finances.

To minimize the hassle of preparing your taxes, you need to keep organized financial records. Personal financial-management software is the right choice to accomplish this task, but that's just a side benefit. Financial-management software is really designed to let you create a budget, track your income and expenses, and compare your budget to what's really going on. Some programs even let you track investment portfolios, plan for retirement, estimate your taxes for future years, and the like.

Many different financial-management programs are on the market. Two of the most popular are MECA's Andrew Tobias Managing Your Money and Monogram's Dollars and Sense. Managing Your Money tracks income and expenses and lets you assign amounts to specific tax categories such as medical expenses and charitable contributions. It goes one step further, however, and estimates your tax liability for up to five years so you can tell if you'll end up owing the IRS or receiving a refund.

Dollars and Sense has a similar predictive capability, but it's packaged as a separate program called Forecast. With Forecast you can import your financial information from Dollars and Sense and compute your estimated taxes for up to three years. Both programs are a good combination of financial management and tax planning. Neither one of them helps you actually prepare your tax return, however, because they don't lead you through the tax forms and schedules.

Two personal-finance programs that work directly with tax-preparation packages are J.K. Lasser's Your Money Manager and Haba/Arrays' Home Accountant. Neither one provides tax-planning functions for future years, but you can export data from them to Your Income Tax and the Tax Advantage respectively. By using these personal-finance programs on a regular basis (say monthly or quarterly) with their tax-preparation complements, you get estimating functions somewhat similar to those of Managing Your Money and Dollars and Sense with Forecast, and they also help you prepare your taxes at the end of the year.

Finally, another class of programs does nothing but tax planning. Two of the more popular packages in this category are Tax Break Planner and Tax MiniMiser, which both require some knowledge of the tax regulations to work effectively.

Proforma Software, the publisher of Tax Break Planner, calls the program a multiyear personal income tax optimizer. Designed primarily for professional tax planners, this product analyzes last year's tax return for overpayment and optimizes the current year's return for the minimum tax. Sunrise Software's Tax MiniMiser uses a base year as a starting point and projects your taxes for up to six years, based on certain assumptions you enter. It estimates both federal and California state taxes.

Some tax-planning-software companies have already stepped forward with products to help you plan for the radical changes that will affect you when you prepare your 1987 taxes. Intuit, for instance, has announced that its Tax Reform Analyzer will show you what the new tax laws will mean to you—and suggest ways you might cut your tax liability under the new laws. The program is available as a template for AppleWorks.

PRODUCT INFORMATION

Andrew Tobias Managing Your Money
MECA
285 Riverside Avenue
Westport, CT 06880
(203) 226-2425
List Price: $199.95
Requires: Apple IIe, IIc, or IIGS; 128K RAM, two disk drives
CIRCLE 377 ON READER SERVICE CARD

The Home Accountant
Haba Systems/Arrays, Inc.
6711 Valjean Avenue
Van Nuys, CA 91406
(818) 994-1899
List Price: $39.95
Requires: Apple IIe or IIc; 48K RAM (expanded version for IIc, 64K RAM)
CIRCLE 378 ON READER SERVICE CARD

J.K. Lasser's Your Money Manager
Simon & Schuster
1 Gulf & Western Plaza, 14th Floor
New York, NY 10023
(800) 624-0023
In NJ (800) 624-0024
List Price: $89.95
Requires: Apple II Plus, IIe, or IIc; 64K RAM; one disk drive
CIRCLE 379 ON READER SERVICE CARD

Dollars and Sense and Forecast
Monogram Software
8295 La Cienega Blvd.
Inglewood, CA 90301
(213) 215-0355
List Price: Dollars & Sense, $119.95; Forecast, $59.95
Requires: Dollars & Sense—Apple IIe, IIc, or IIGS, 128K RAM; Forecast—IIe, IIc, or IIGS; 64K RAM
CIRCLE 380 ON READER SERVICE CARD

Tax MiniMiser
Sunrise Software
240 Twin Dolphin Drive, Suite E
Redwood City, CA 94065
(415) 595-5255
List Price: $119 (CA Version, $149)
Requires: Apple IIe, IIc, or IIGS; 128K RAM; two disk drives
CIRCLE 381 ON READER SERVICE CARD

Tax Break Planner
Proforma Software
2706 Harbor Blvd., Suite 203
Costa Mesa, CA 92626
(714) 641-3846
List Price: $180; updates, $75
Requires: Apple II Plus, IIe, IIc, IIGS, or III with emulator; 64K RAM suggested; two disk drives recommended
CIRCLE 382 ON READER SERVICE CARD

Tax Reform Analyzer
Intuit
540 University Avenue
Palo Alto, California 94301
(415) 322-0573
List Price: $29
Requires: Apple IIe, IIc or IIGS; 128K RAM
CIRCLE 383 ON READER SERVICE CARD

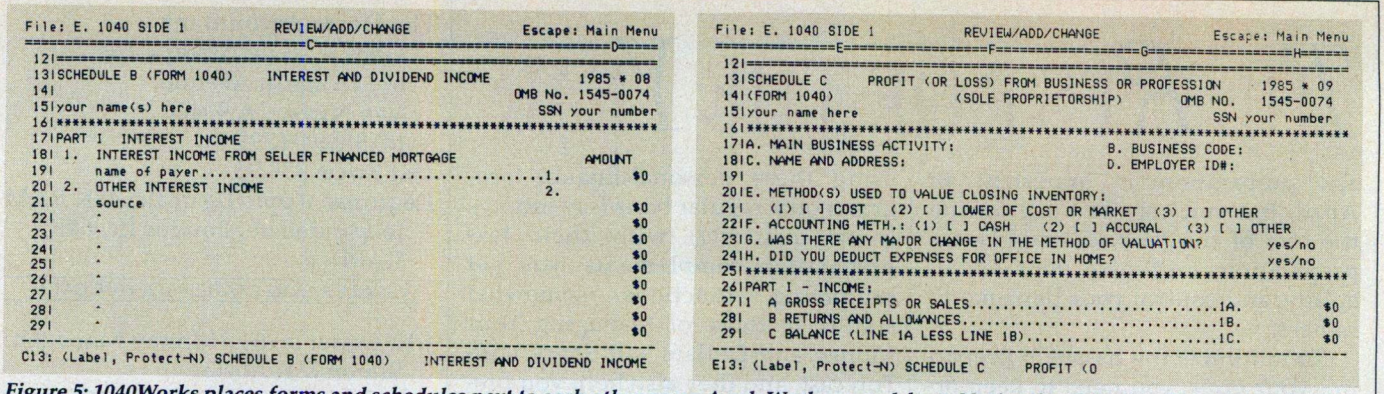

Figure 5: 1040Works places forms and schedules next to each other on an AppleWorks spreadsheet. Notice that Schedule B starts in cell C12, while Schedule C starts in E12.

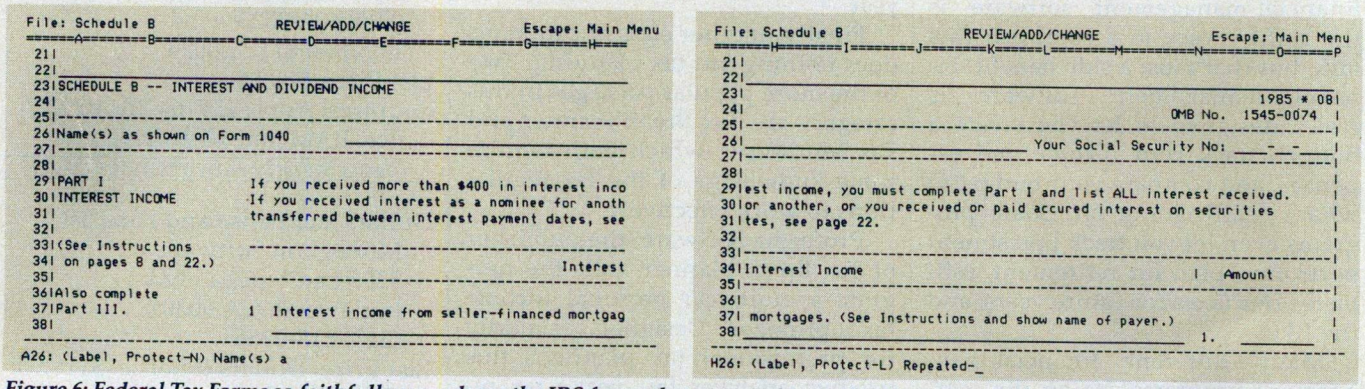

Figure 6: Federal Tax Forms so faithfully reproduces the IRS forms that you need to scroll sideways to read explanations and then fill in the blanks, which makes it easy to get lost.

don't calculate your tax liability. You have to look up the amount you owe in the IRS booklet that comes with your forms, increasing your chances for errors. Federal Tax Forms does create good-looking IRS-approved forms (not the 1040), but the program's designers placed too much emphasis on the output, rather than simplifying data entry.

The Bottom Line

All these programs have their strengths and weaknesses. For professional tax preparers, Tax Preparer is the only logical choice of these six programs. For a simpler approach, the Tax Advantage is a good program. Templates can be very error-prone because of the amount of manual effort you have to put in to complete a return. Overwriting certain information is too easy, and data entry can be cumbersome. If you insist on using a template, 1040Works is a good choice.

Remember, we can't vouch for the accuracy of any of these programs. Double-check your output carefully, make sure you include all the proper information, and don't forget to sign your check. ✚

Steve Mann is a San Francisco writer whose specialty is personal-finance software.

PRODUCT INFORMATION

Tax Preparer
HowardSoft
1224 Prospect Street, Suite 150
La Jolla, CA 92037
(619) 454-0121
List Price: $250
Requires: Apple II Plus, IIe, IIc, or IIGS; 64K RAM; two disk drives recommended

CIRCLE 370 ON READER SERVICE CARD

J.K. Lasser's Your Income Tax
Simon & Schuster
1 Gulf & Western Plaza, 14th Floor
New York, NY 10023
(800) 624-0023/In NJ (800) 624-0024
List Price: $69.95
Requires: Apple II Plus, IIe, IIc, or IIGS; 80-column card; one disk drive

CIRCLE 371 ON READER SERVICE CARD

Swiftax
Timeworks
444 Lake Cook Road
Deerfield, IL 60015
(312) 948-9200
List Price: $69.95
Requires: Apple IIe, IIc, or IIGS; 128K RAM; one disk drive

CIRCLE 372 ON READER SERVICE CARD

The Tax Advantage
Double Eagle Software, Inc.
2210 Wilshire Boulevard, Suite 875
Santa Monica, CA 90403
(213) 459-9748
List Price: $59.95
Requires: Apple II Plus, IIe, IIc, or IIGS; 48K RAM, Applesoft in ROM; two disk drives recommended

CIRCLE 373 ON READER SERVICE CARD

Tax Advantage II
Haba Systems/Arrays, Inc.
6711 Valjean Avenue
Van Nuys, CA 91406
(818) 994-1899
List Price: $69.95
Requires: Apple IIe or IIc; 48K RAM; DOS 3.3

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1040Works
Personal Financial Services
P.O. Box 1401
Melville, NY, 11747
(516) 261-8652
List Price: $23.95
Requires: Apple IIe, IIc, or IIGS; 128K RAM

CIRCLE 375 ON READER SERVICE CARD

Federal Tax Forms
Sky Computer Resources
P.O. Box 204
Portland, OR 97207
(503) 234-7291
List Price: $39.95; $2.50 for shipping and handling. $5 each additional form.
Requires: Apple IIe, IIc, or IIGS with 128K RAM; II Plus with AppleWorks patch and 55K or larger desktop; or III with III EZ Pieces

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WHO'S GOT THE FORMS?

Tax programs don't necessarily help you prepare your tax data for every form and schedule. Here's a list of which forms these programs prepare. Note that some programs help you prepare the information but don't print it out in an IRS-approved format. Also, some products that print out IRS-approved forms can only print out a selection of forms—and none are able to print out any variations on the 1040, because of the IRS's exacting specifications for this form. We've listed forms from 1986 versions of most of these programs. Be sure to check with the vendor, though, to make sure current releases help you prepare the forms critical to you. Sometimes additional forms are available.

	Tax Preparer	J.K. Lasser	Swiftax	Tax Advantage	1040Works	Federal Tax Forms
FORMS						
1040	■	■	■	■	■	■
1040A		■	■			■
1040EZ		■	■			
2106	■	■	■	■	■	■
2119	■	■			■	
2210	■	■				
2441	■	■	■	■	■	
3468	■					
3800	■					
3903	■	■			■	
4137		■				
4562	■	■	■	■	■	■
4684		■				
4797	■	■				
4835		■				
4972					■	
5329		■				
6251	■	■		■	■	
6252	■	■				
SCHEDULES						
A	■	■	■	■	■	■
B	■	■	■	■	■	■
C	■	■	■	■	■	■
D	■	■	■	■	■	■
E	■	■	■	■	■	■
F	■	■	■		■	■
G	■	■	■	■	■	
R	■	■	■		■	
SE	■	■	■	■	■	■
W	■	■	■	■	■	■
PRINT-OUTS						
IRS-Approved	■			■	■	■
On pre-printed forms	■	■	■	■		

Personal Accountant™
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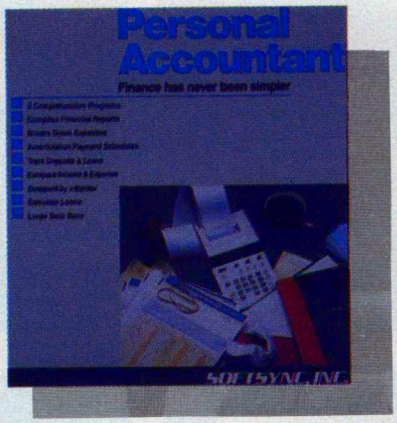

The Personal Accountant will keep track of your income, expense, loans, and deposits. It will tell you about your net worth, profits, taxes, and even speculate about the future. It generates professional financial statements and account histories. It calculates loans and future value of savings and it even keeps track of phone numbers. You don't have to know anything about debit and credit to put the Personal Accountant to work for you. And you don't have to be a financial genius to know that this is money well spent. Spend $49.95, (Apple//, Macintosh and IBM) or $34.95 (Commodore 64 and 128) to keep your financial life in order and invest the rest.

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Computer Talk

The Echo IIb speech synthesizer is compatible with the Apple®IIe, II+ and the new Apple IIGS. It offers both text-to-speech and natural sounding speech capabilities. Its unique text-to-speech program gives the Apple an unlimited vocabulary. The Echo IIb also features distinctive natural sounding speech in a female voice. This fixed vocabulary of 720 words is supplied on disk and can easily be added to BASIC programs.

The Echo IIb, like the Echo II, Echo+, and Cricket,™ is compatible with numerous educational and special needs programs from over eighty software manufacturers. Contact Street for a list of companies offering these talking programs.

Street Electronics Corporation

1140 Mark Avenue Carpinteria, California 93013 (805) 684-4593

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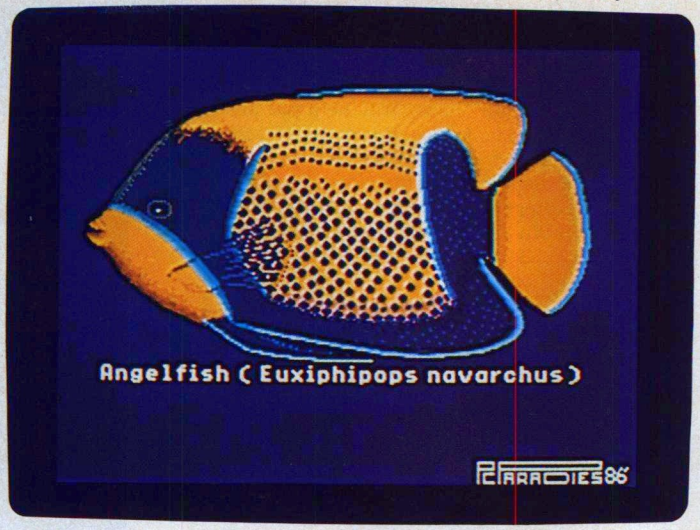
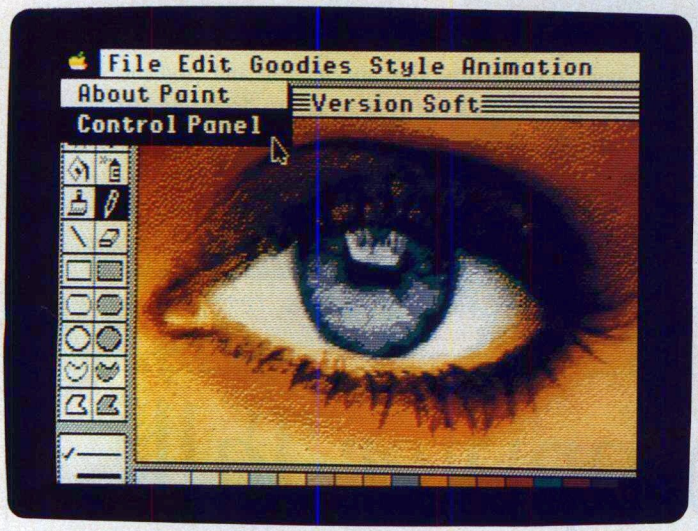
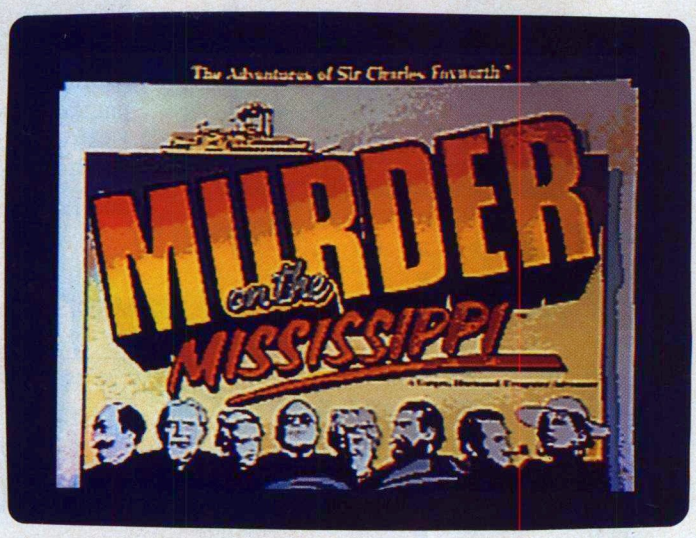
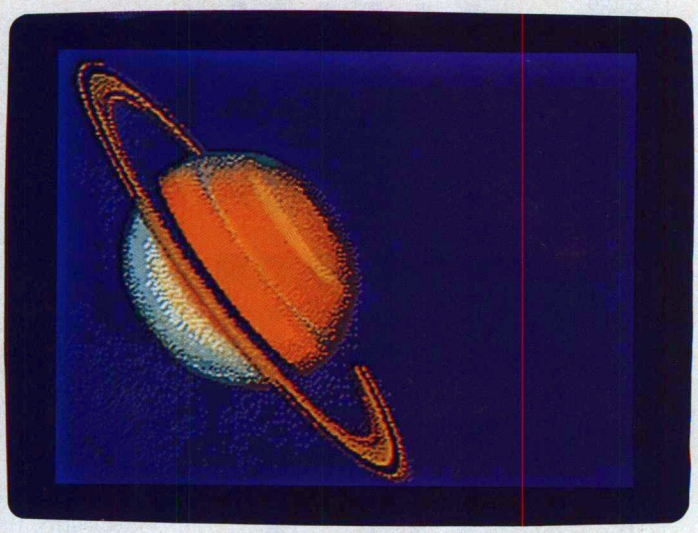
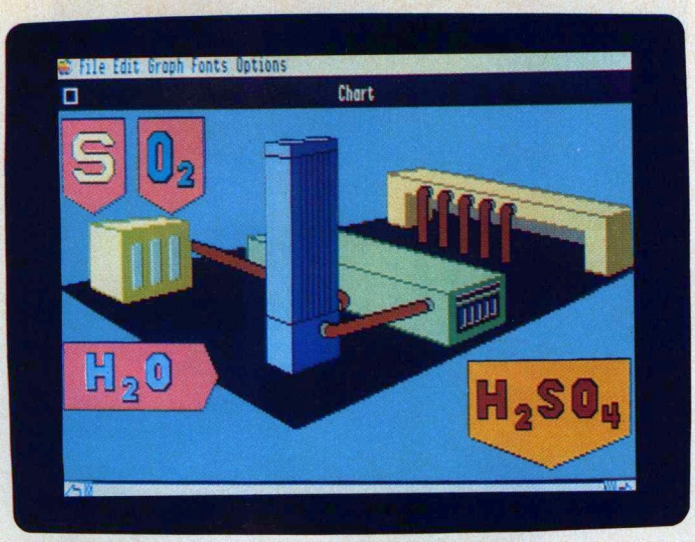


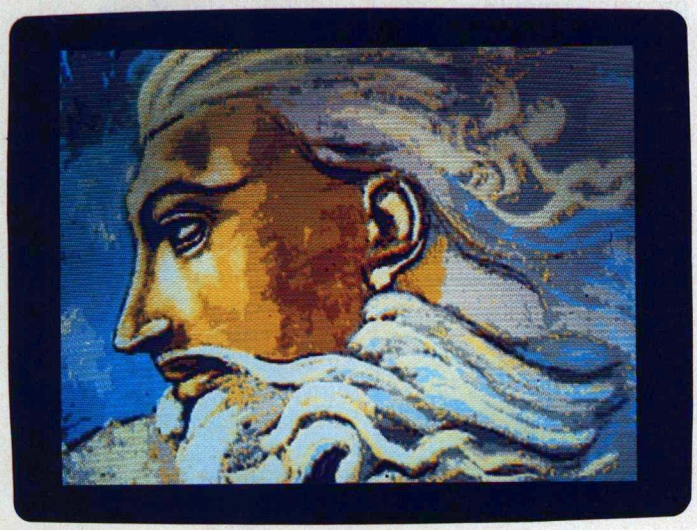






You won't believe





Every image you see here was generated by the new Apple IIGS™ Personal Computer.

It can create graphics in 4,096 colors. With near-photographic quality in two new modes–640 x 200 or 320 x 200 pixels.

The power behind this display is a 16-bit 65C816 microprocessor and a standard 256K of RAM, expandable to an awesome 8 megabytes with the appropriate card.

Even with such spectacular talents, the Apple IIGS hasn't forgotten its heritage. In fact, we've combined the hearts and minds of the Apple IIe and the Apple IIc on a single IIGS chip. So it can run nearly all 10,000 existing Apple II programs–but up to three times faster than they've ever run before.

Like the IIe, the Apple IIGS is eminently expandable, with seven expansion slots for peripherals and a new memory expansion slot. Like the IIc, it has built-in peripheral ports for disk drives, printers, modems, the AppleTalk® Personal Network and Apple DeskTop Bus devices such as a detachable keyboard and mouse.

But you haven't heard anything yet. Because this Apple® is the only personal computer with a 32-oscillator sound chip capable of synthesizing up to 15 separate voices.

That means it can reproduce everything from the glory of a symphony orchestra to the subtleties of human speech.

For a closer look, visit your authorized Apple dealer.

You'll find it an eye-opening experience. And that's just the half of it.

The new Apple IIGS. The power to be your best.℠

your ears, either.

PICK OF THE CROP
BY FRED DAVIS AND LISA RALEIGH

Touch windows, toys, tools, and tablets—a compendium of interesting products for you and your Apple, too.

PRODUCT SPOTLIGHT

A NICE TOUCH

It seems like such a natural motion to just reach out and touch whatever it is you want to change on the screen. And with the Touch Window, from Personal Touch Corporation, you can do just that. The Touch Window attaches to the computer screen and, with specially written software, allows you to use your finger as a pointer. Alternatively, you can use the window as a graphics tablet in your lap. The main application for the Touch Window is education, and several educational-software companies have modified their programs for use with it. You can find programs such as Bank Street Storybook, CAD-Draw, The Factory, and Touch and Write (which teaches the Palmer method of handwriting), as well as several programs from the Handicapped Children's Center in Kansas City—all for the Touch Window. *(List Price: $199.95)*

Requires: Apple II Plus, IIe, IIc, or IIGS; 64K RAM; one disk drive (cable for Apple II Plus not included; available separately)

Touch Window
Personal Touch Corporation
4320 Stevens Creek Blvd., #290
San Jose, CA 95129
(408) 246-8822
CIRCLE READER SERVICE NO. **401**

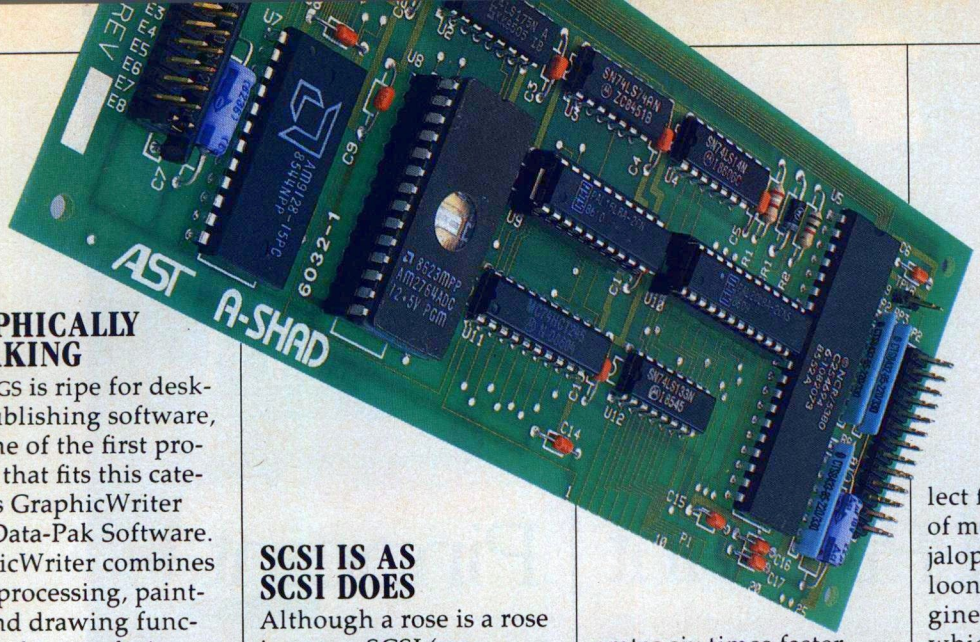
RETAIL SYSTEM

Many supermarkets and other large retailers have computerized point-of-sale systems that use bar-code readers to track sales. The main drawback of the systems large retailers use is that they cost $100,000 or more. Now this technology is available to small businesses equipped with Apple II-series computers.

The Advanced Retail Supervisor from Abacus Systems adds a cash drawer and bar-code reader to an Apple and turns it into a sophisticated electronic cash register with full point-of-sale and inventory-control capabilities. The system's features include the ability to look up prices of 3000 different items, print detailed sales receipts, immediately update inventory as items are sold, and print bar-code labels on the ImageWriter. *(List Price: Advanced Retail Manager software, $795; cash drawer, $295; bar-code reader, $995)*

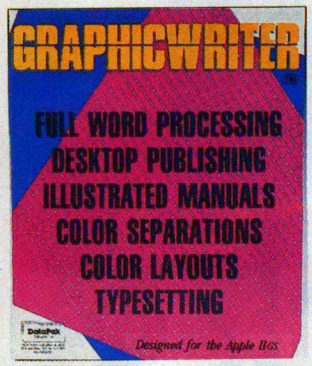
Requires: Apple IIc, enhanced IIe, or IIGS; 128K RAM; two 5¼-inch disk drives

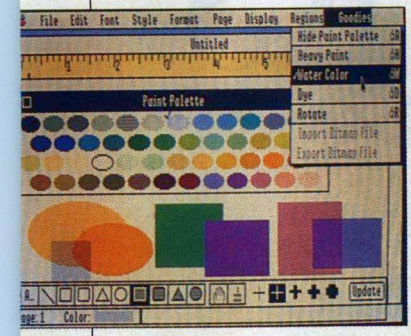
Advanced Retail Supervisor
Abacus Systems
707 Cass Street, Suite 2
La Crosse, WI 54601
(608) 785-1740
CIRCLE READER SERVICE NO. **402**



GRAPHICALLY SPEAKING

The IIGS is ripe for desktop-publishing software, and one of the first programs that fits this category is GraphicWriter from Data-Pak Software. GraphicWriter combines word-processing, painting, and drawing functions to let you design creative documents. You





can lay out newsletters, fliers, and the like with GraphicWriter's "regions," on-screen areas you can move around and modify. With a color printer, you can print out your creations in as many as 48 colors. *(List Price: $149.95)*

Requires: Apple IIGS, 512K RAM

GraphicWriter
DataPak Software, Inc.
14011 Ventura Blvd.,
#507
Sherman Oaks, CA 91423
(818) 905-6419

CIRCLE READER SERVICE NO. **403**

SCSI IS AS SCSI DOES

Although a rose is a rose is a rose, SCSI (pronounced "scuzzy," the Small Computer Systems Interface) is not necessarily SCSI. There are different varieties of this protocol, meaning that Apple's approach to SCSI won't necessarily be the same as IBM's or anyone else's. Apple-related vendors are following Apple's lead, however, and adapting to the Apple way of implementing the standard.

AST Research, Inc., for example, has just brought out a SCSI card for the Apple II series that's compatible with Apple's SCSI standard. (Apple built in a SCSI interface on the Macintosh Plus and is working on a SCSI card for the IIGS.) With the AST Apple II SCSI Card, you can connect your Apple II-series computer with any device that works with the Apple implementation of SCSI. The list includes the Apple Hard Disk 20 and the AST 2000 and 4000—the latter two are hard-disk drives with built-in tape backup systems. In the future, expect to see CD-ROM devices that require a SCSI interface.

Why would anyone want a SCSI card? In a word: speed. According to AST, this interface operates six times faster than does a serial connection. *(List Price: $129)*

Apple II SCSI Card
AST Research, Inc.
2121 Alton Avenue
Irvine, CA 92714
(714) 836-1333

CIRCLE READER SERVICE NO. **404**

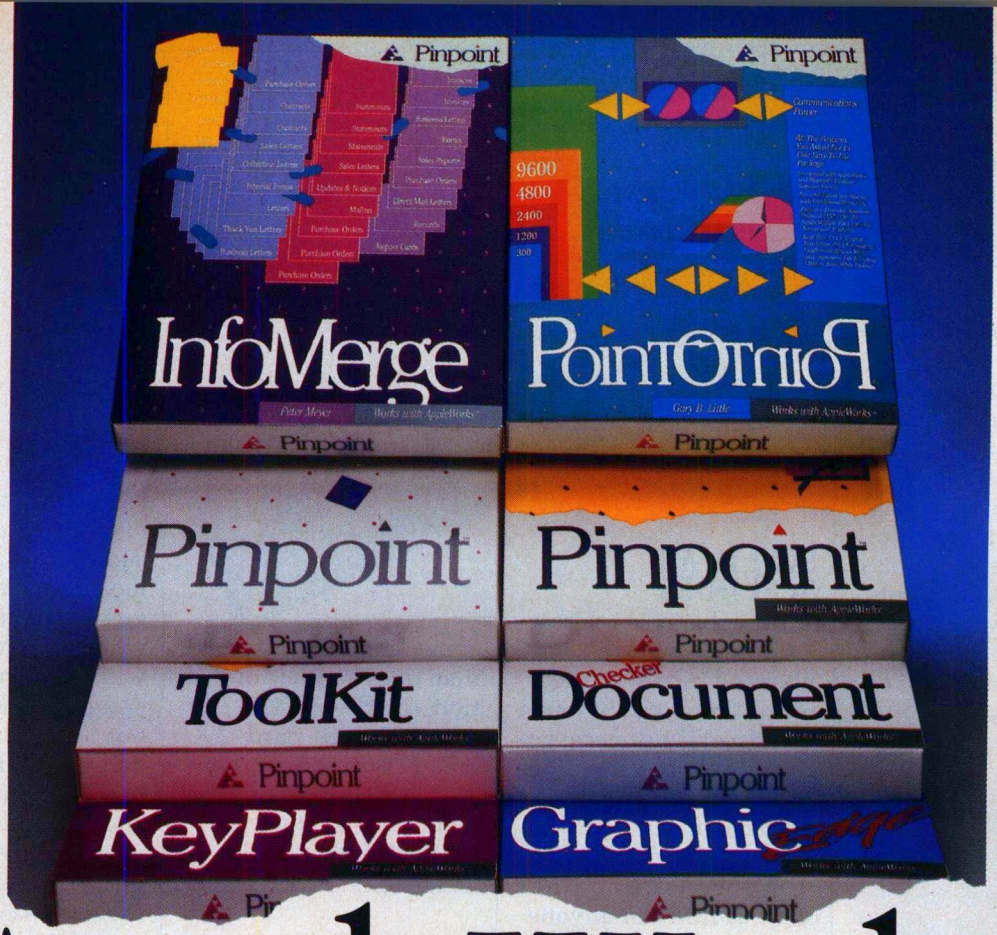
BABES IN TOYLAND

For the young at heart, there's Brøderbund Software Toy Shop, a program that represents the next step in creativity software: printouts of three-dimensional toy models.

With Toy Shop, you select from among a library of mechanical marvels—a jalopy, a jet, and a balloon-powered steam engine, to name a few—which you can customize with patterns, pictures, and prose. You then print out the model, mount it on card stock that Brøderbund supplies, cut it out, and assemble it. Then you're ready to roll—literally. These are working models awaiting the appropriate nudge from you to get moving. *(List Price: $59.95)*

Requires: Apple II Plus, IIe, or IIc; 64K RAM; one disk drive; printer

Toy Shop
Brøderbund Software
17 Paul Drive
San Rafael, CA 94903
(415) 479-1700



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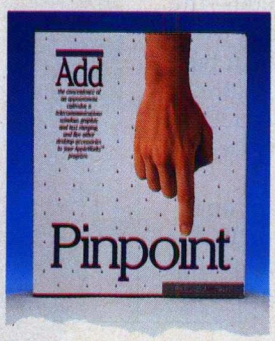
Pinpoint



Pinpoint Publishing
P.O. Box 13323
Oakland, CA 94661-0323
(415) 654-3050

CIRCLE 239 ON READER SERVICE CARD

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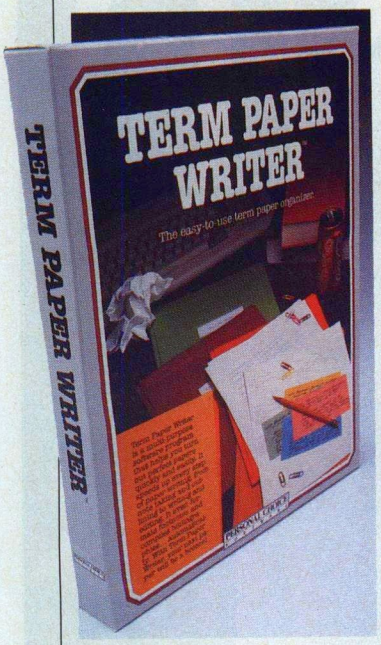
PRODUCT SPOTLIGHT



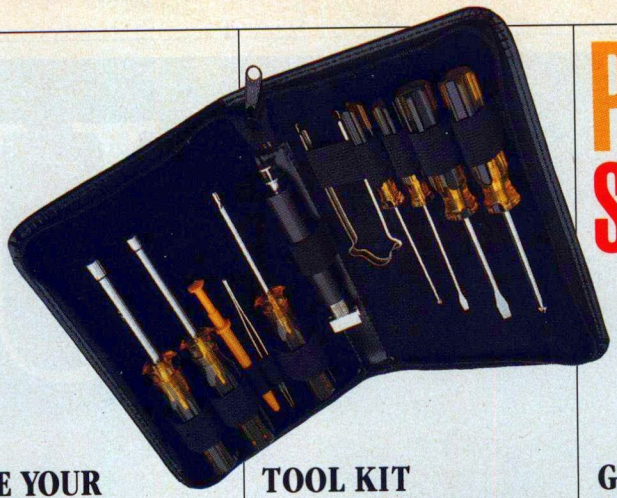
IF IT WERE ONLY A GHOSTWRITER TOO

As we say good-bye to the presidents' birthdays and look forward to Easter week, chances are that the students among us must confront the prospect of term papers. Enter Personal Choice Software (a division of Activision, Inc.) with its Term Paper Writer. This software package includes a note-taking function to help students organize notes and paste them into term papers. It also has an outlining feature as well as provisions for making footnotes and a bibliography. And, of course, it contains a word-processing program for drafting the final masterpiece. Now, if it could only write the paper itself. . . *(List Price: $59.95)*

Requires: Apple IIe or IIc, 128K RAM

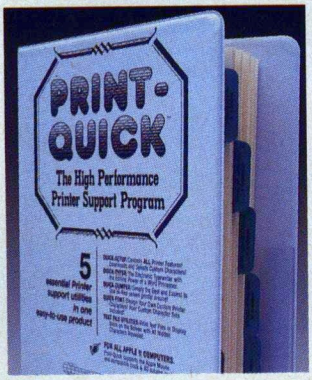
Term Paper Writer
Personal Choice Software
P.O. Box 7287
Mountain View, CA 94039
(415) 960-0410

CIRCLE READER SERVICE NO. **405**



TAME YOUR PRINTER

Print-Quick is a combination of five handy utilities that will help you get the most out of your printer. Print-Quick includes Quick-Setup to help you take advantage of your printer's built-in features; Quick-Typer, which turns your printer into a smart typewriter;



Quick-Font, which allows you to edit and design your own character sets; Quick-Dumper, a hi-res screen printer; and Text File Utilities, which lets you display or print text files with all the hidden command characters revealed. Print-Quick works with a multitude of printers and interface cards and features more than 30 on-line help screens. *(List Price: $49.95)*

Requires: Apple II Plus, IIe, or IIc

Print-Quick
Third Wave Technology, Inc.
11934 Lorain Avenue
Cleveland, OH 44111
(216) 671-8991

CIRCLE READER SERVICE NO. **406**

TOOL KIT

Ever have trouble finding just the right tool for installing expansion boards and cables, inserting chips, or making minor computer repairs? The new Computer Tool Kit from Curtis contains 11 of the most-needed tools for the personal-computer handyman. Packaged in a compact zipper case, the Computer Tool Kit contains a patented chip inserter with pin straightener, a chip extractor, two Phillips screwdrivers, two slotted screwdrivers, two nut drivers, a TORX screwdriver, and a three-claw parts holder. All the tools are demagnetized to protect computer components from damage. *(List Price: $29.95)*

Computer Tool Kit
Curtis Manufacturing Company, Inc.
305 Union Street
Peterborough, NH 03458
(603) 924-3823

CIRCLE READER SERVICE NO. **407**

GRAPHICS TABLET

The Kurta Graphics Input System is a combination mouse substitute and graphics tablet for the Apple IIGS. The Graphics Input System features a full 8½ × 11-inch drawing area and a special cordless pen. It's easier to create graphics by either drawing or tracing with the cordless pen than it is with a mouse. The system comes with special desk-accessory software that allows you to set the pen in either an absolute-position mode for drawing or in a relative-position mode for use as a mouse substitute for menu selections and cursor pointing. You can position the tablet on either side of the keyboard for right-handed and left-handed users. *(List Price: $495)*

Requires: Apple IIGS

Kurta Corporation
4610 South 35th Street
Phoenix, AZ 85040
(602) 276-5533

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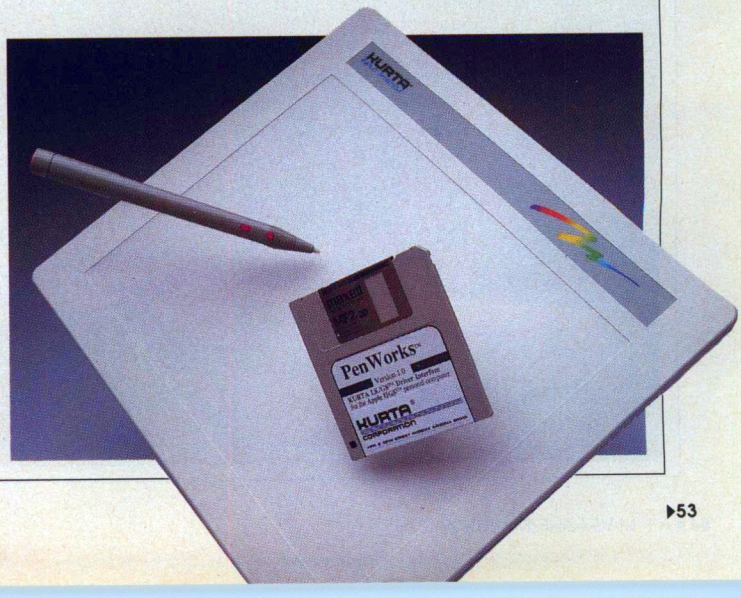
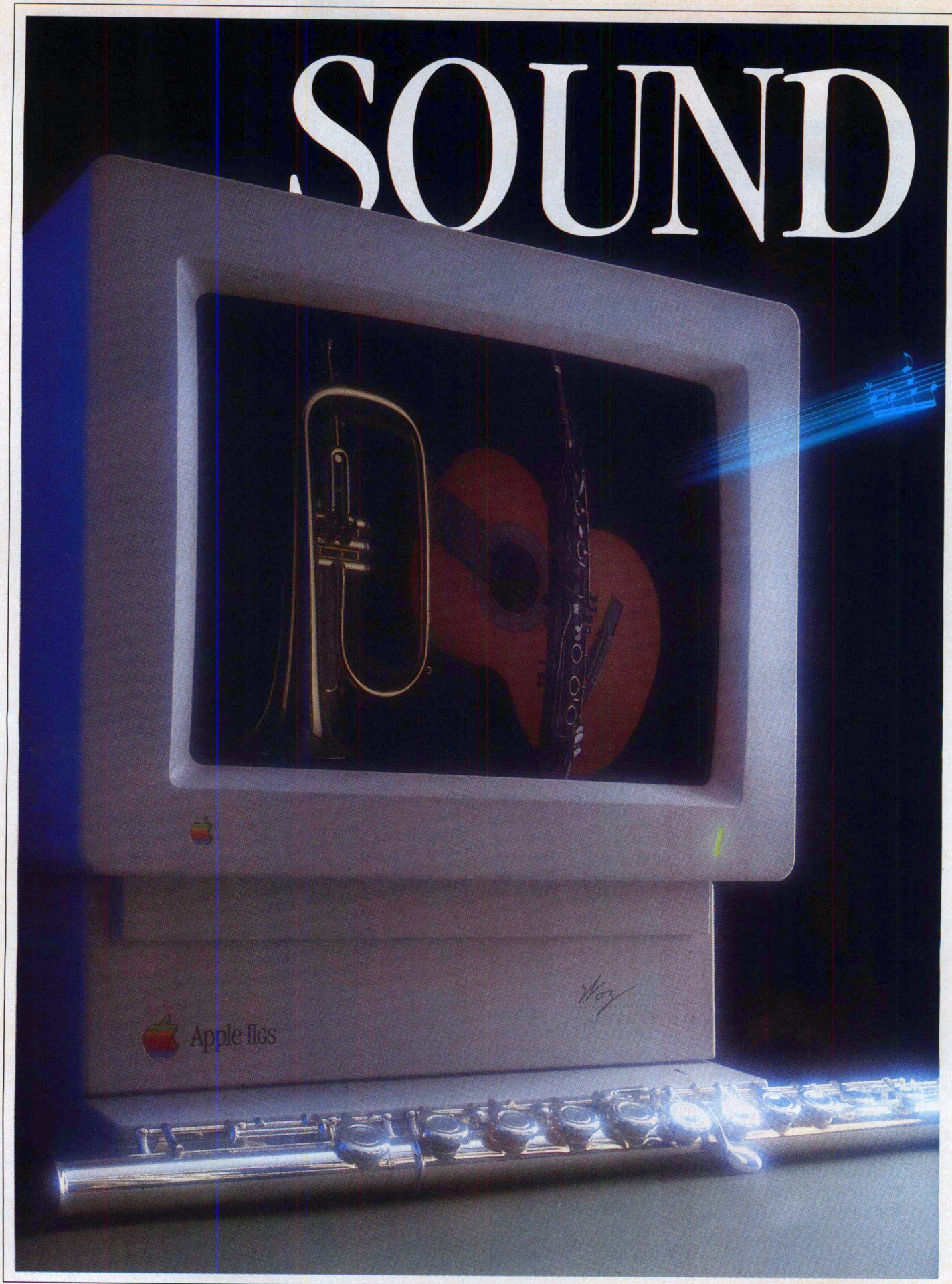


SOUND



PHOTOGRAPHY BY DAVID BISHOP

BASICS

APPLE IIGS *BY ROB SWIGART*

What programmers need to know about the nature of sound and how the Apple IIGS produces it

The Apple IIGS contains the most powerful sound circuitry available in a personal computer. Yet to use the Ensoniq Digital Oscillator Chip, or DOC, and its specially allotted 64K RAM, a programmer has to know how to use the special tools Apple provides. In order to use the tools, the programmer must know something about the nature of sound and how the computer combines all the elements to produce natural-sounding instruments, sound effects, and speech. We will begin with some background information about sound before discussing the sound tools themselves.

Ripples

Most of us already know something about what sound is. We remember from school the images of ripples on a pond when we drop a stone, how the ripples go outward in concentric circles. Sound, we were told, was simply ripples on the air. Mozart and Muzak, raindrops and rockets, sirens and songs, frogs and dogs croaking and barking—all are ripples.

We call these concentric circles vibrations, formed as the air compresses and expands again. A vibrating source, such as a drum or a voice, a falling boulder, or the small splash of a drop of water creates the vibrations. We hear the sound because when the vibrations in the air reach our eardrums, they in turn vibrate. Like the skin of a drum, our eardrum is a diaphragm, and it converts the vibrations into the nerve impulses we experience as sound.

The number of times the vibration occurs is called its frequency. Frequency is usually expressed in cycles per millisecond (one one-thousandth of a second) or hertz (Hz). Middle C on a piano (or any musical instrument), for example, has a frequency of 264 Hz. The A above middle C vibrates at 440 Hz, which is the basic pitch for tuning many instruments. A pitch is a pure tone.

When you draw a picture of a sound frequency, or a waveform, it looks like figure 1.

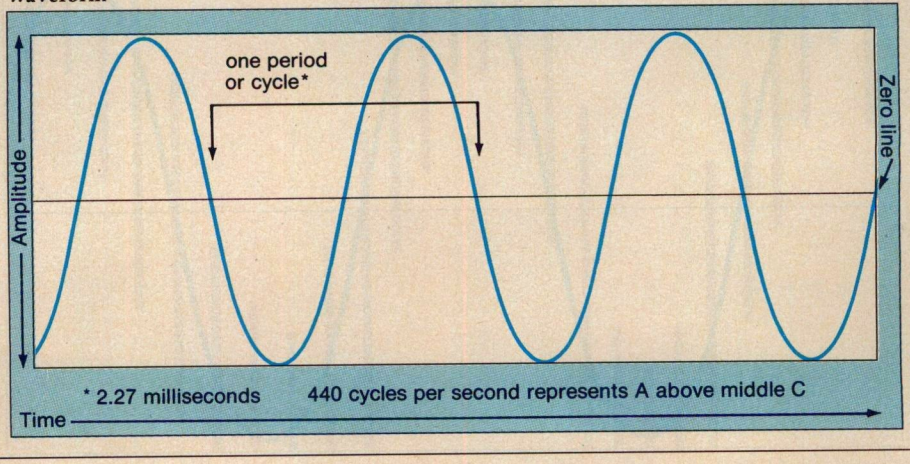
The vertical scale represents amplitude, or the loudness of the tone; the horizontal scale is time. One up-and-down motion is called a period, or cycle—the basic unit of sound. The chart has a zero line because amplitude has a positive and a negative component, just like the ripples on the pond's surface. In this figure, one cycle is approximately 2.27 milliseconds, or 440 hertz (thousand cycles per second).

The speaker in the IIGS or your stereo can convert electrical signals into audible ones by vibrating a diaphragm—hearing in reverse.

The Importance of Acoustics

Sounds are affected by the space through which they move. The sound of a car engine on the highway has a different quality from that of the same engine in a garage, for instance. For some people, singing in the shower is much more pleasant than singing in a meadow because the locations' acoustics differ. Con-

Figure 1: A picture of a sound frequency, or waveform



cert halls are carefully designed to make acoustic space as natural-sounding as possible.

Three things can affect acoustics: the sound source, the acoustic space, and the transducer (the microphone or loudspeaker). Acoustic space helps determine the quality of a sound, but it is not the only factor that does so.

Types of Sound

A cycle of a simple sound is a pure tone, nothing like the complex sound of a musical instrument or the human voice.

Waveforms that do not follow a regular, periodic, pattern—irregular waveforms—are called noise. Radio static and the sound of a waterfall are examples of noise. Completely random sound is called white noise. You can make sound in three ways: direct, converted, or generated. These three kinds of sound are called analog, digitized, and synthesized.

You can shout, play an instrument, tap-dance, or start up your chain saw. The sounds that are created in these ways are called analog sounds because they happen in real time, in the real world (as opposed to the electronic world inside the Apple IIGS).

For a computer to perform something useful with sound, though, it must contain some hardware to convert the sound into digits (actually a series of 0s and 1s, but that's a different story) and play those sounds back through a speaker. In other words, you must either digitize (or sample) the sound through analog-to-digital (A/D) conversion, or you must synthesize the sound.

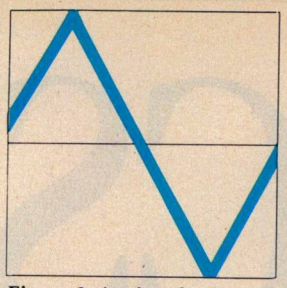


Figure 3: A triangle wave

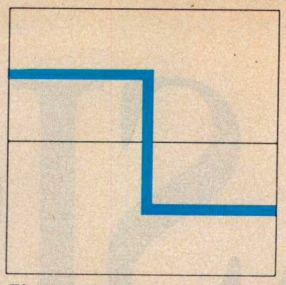


Figure 4: A square wave

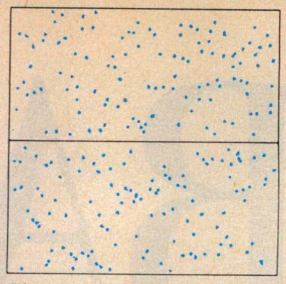


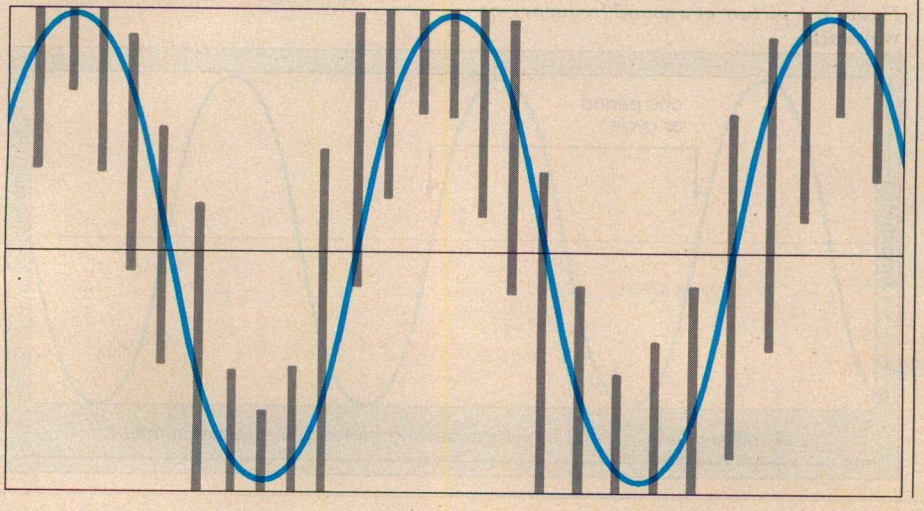
Figure 5: White noise

To convert sounds from analog to digital, you must decide how many times during the cycle you want to take a reading, or sample, of the sound's waveform. This number is called the sampling rate, and the higher the rate the more accurate the sound will be, but a higher sampling rate takes up more memory. Figure 2 shows what a sampled sound might look like.

The third way of creating sounds is to generate them directly, which gives you synthesized sound and is the basis for music synthesizers such as the Digital Oscillator Chip (or DOC) in the Apple IIGS.

The DOC can create sounds by synthesizing them and electronically vibrating the diaphragm of the internal or external speaker, but to generate the sounds of a musical instrument, the DOC has to have a waveform table to draw on. Let's look a little more closely at what makes up a waveform. Waveforms come in four basic flavors: sine waves, triangle waves, square waves, and noise. When you create a waveform table for a musical instrument, you do so by combining these basic waveforms in various ways.

Figure 2: An example of what a sampled sound might look like. The higher the sampling rate the more accurate the sound will be.



An example of the familiar sinuous shape of a sine wave appears in figure 1. A sine wave is a pure, clear tone. A triangle wave looks like the waveform in figure 3. It creates a buzzing effect. A square wave looks like figure 4. It also creates a buzzing sound. Noise is an aperiodic, or irregular, waveform that does not repeat itself. A graph of white noise might look like figure 5.

Instruments

The sound of instruments comprises combinations of various waveforms along with different proportions of partials. Figure 6 shows what the waveforms of various instruments might look like.

To play only a waveform would produce a steady, continuous sound, not a musical sound, however. When a stone falls into a pond, the plopping sound it makes is not an even, continuous pitch, but a complex series of events. First there is silence. Then the sound begins and climbs rapidly in loudness, falls off abruptly, lingers for a while, and finally dies away to silence once more. This sequence, from silence to silence again, is called a sound's envelope. The four stages of the envelope are the attack, the decay, the sustain, and the release. Together they are referred to as the ADSR. Figure 7 shows a typical ADSR, or envelope.

The sound envelope is important for the quality of sounds. For example, different instruments have very different envelopes. The envelope is one of the easiest parts of a sound to manipulate with a computer, and the Apple IIGS sound tools are there to do this task as well as others.

The steepness of the attack slope shows how quickly the instrumental sound reaches its peak. If the attack angle is steep, the sound has a sharp, fast introduction. The same is true of the rest of the ADSR chart. A piano note has a long sustain and a slow release, for example, whereas a drum does not sustain for long and

EVERY TIME I TRIED T
PRINT A SPREADSHEE
IT RAN RIGHT OFF TH

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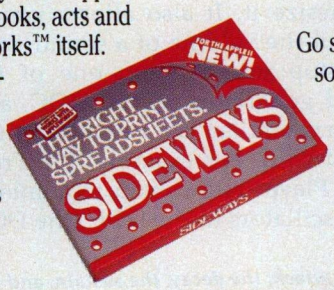

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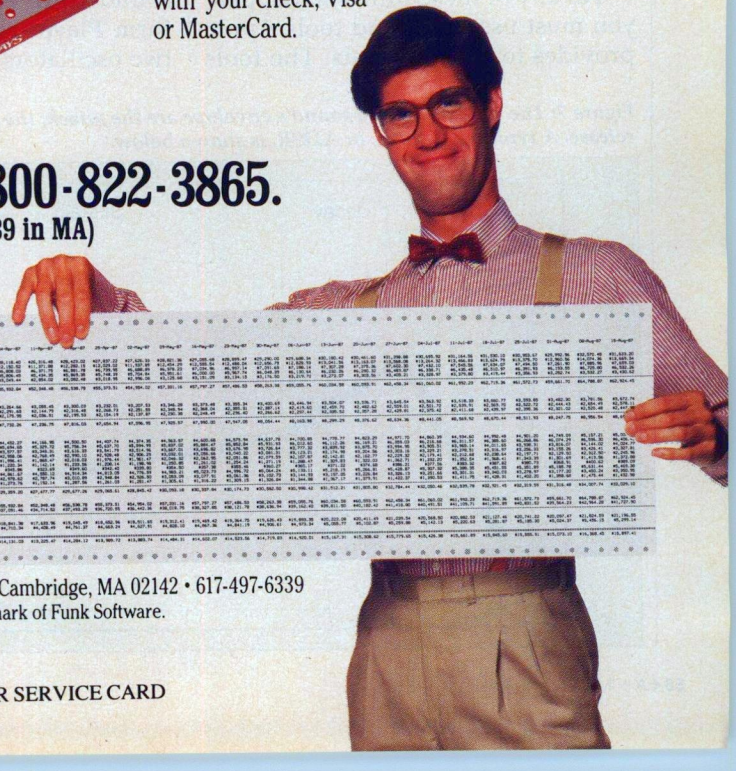

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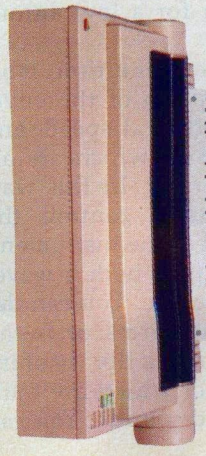
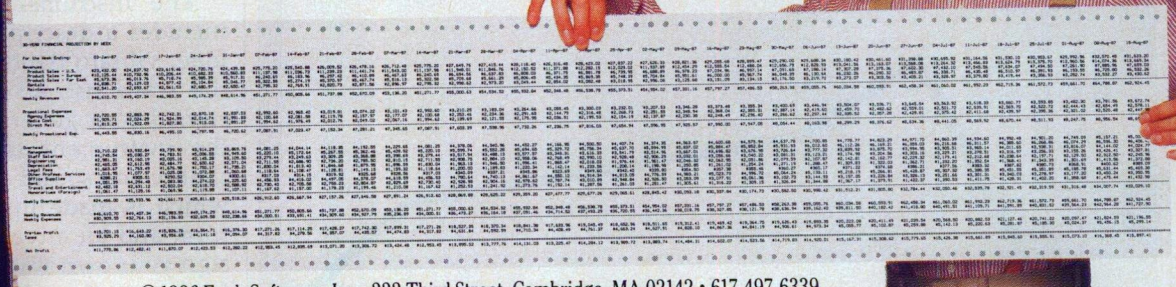
(1-617-497-6339 in MA)





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CIRCLE 154 ON READER SERVICE CARD

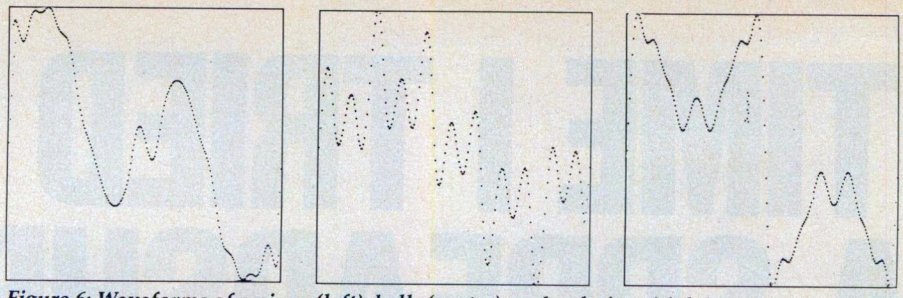


Figure 6: Waveforms of a piano (left), bells (center), and a clarinet (right)

releases quickly. Thus, for some instruments, the attack is very steep and the sustain and release are shallow, and for others the attack is slow and the release is sudden.

Speech

Computer scientists interested in sound generation make a distinction between spoken sounds in natural language and musical voice. Some tools may become available for the Apple IIGS that will allow programmers to produce speech. Speech presents special problems in the generation of sound, though, because the sounds we can make with our vocal chords are extremely complex, and the ways in which we understand words and sentences are still poorly understood. Thus personal computers that convert phonemes, or text, to speech all sound as if they were alcoholic robots with speech impediments.

Of course, the Apple IIGS can digitize speech as easily as music, which is why the Apple IIGS demonstration disk's speech sounds so good.

Sound Tools

For any of these things to happen, you must use the sound tools Apple provides to create sounds. The tools fall into three categories: ROM-based free-form generator tools, RAM-based note-synthesizer tools, and RAM-based sound-sequencer tools. Each level of tool builds on the one below it, and they have become available in this order for that reason (see figure 8).

Freeform Player

The Freeform Player, which is ROM-based, moves data from main RAM to the DOC RAM and plays back digitized sound but does not synthesize it. It also allows you to control the volume of a sound, start and stop sounds from one of the sound generators in the DOC, and perform similar tasks involving the sound chip. For example, the Freeform Player allows you to combine two oscillators in the DOC (the DOC contains 32 oscillators that create sounds) into one instrument in what is called the Swap mode. You can then use these paired oscillators to generate sounds. Together the two oscillators are called a generator. (Thus there are 15 generators in the DOC, with the other two oscillators reserved for timing and other housekeeping functions.)

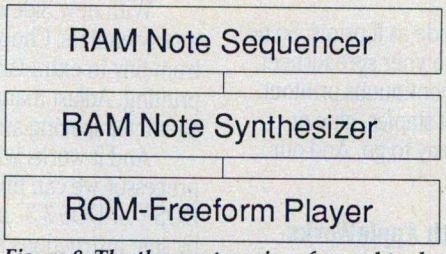


Figure 8: The three categories of sound tools

Before you can use the Freeform Player, though, you must make a sound-tool start-up call, which assigns a work area in RAM for the sound tools. In order to use the sound tools, then, you must understand the Tool Locater, which keeps track of the sound tools, and you must have access to the Memory Manager. (For a discussion of the Tool Locator and Memory Manager, see "What's in the IIGS Toolbox," *A+*, November 1986.)

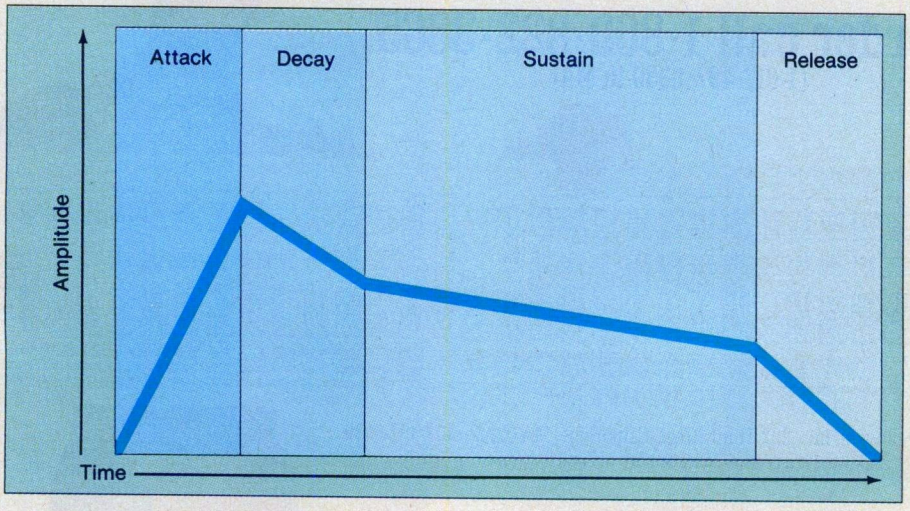
Note Synthesizer Tools

The note synthesizer tools, by contrast, are RAM-based. They allow you to turn on, sustain, and turn off individual notes. To play a note, though, you must first build an instrument-definition table, either by programming it yourself or acquiring ready-made tables, which should become available soon.

An instrument-definition table controls the timbre and quality of a sound and refers to a waveform stored in the DOC RAM. The most important prerequisite for using the note synthesizer tools is to have them. Since they are RAM-based, Apple will provide them on a disk. Usually RAM-based tools are available from APDA (the Apple Programmers and Developers Asssociation, 290 SW 43rd Street, Renton, WA 98055) or from programmers' clubs or users' groups. Apple gives the tools away unless you are going to use them in a commercial application. In that case, you can license them for a low annual fee.

The instrument-definition table includes a description of the envelope, vibrato depth and speed, and the wave list, all of which are assigned to a generator. In this way, the instrument table controls the timbre and sound of the instrument, which is made up of both a waveform and an envelope. You can design your own waveforms, or, in the future, get them from a library of instruments, many of which are built up out of sampled sounds. You can

Figure 7: The four stages of a sound's envelope are the attack, the decay, the sustain, and the release. A typical envelope, or ADSR, is shown below.



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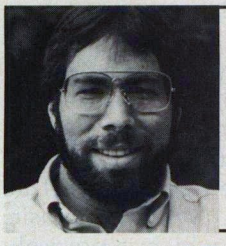

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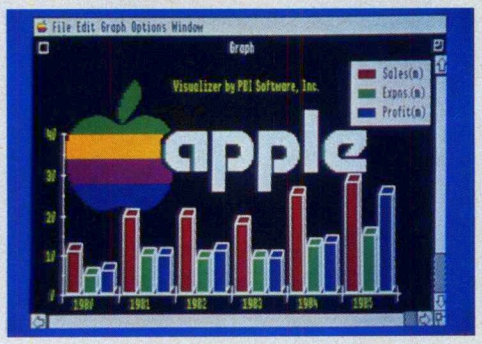

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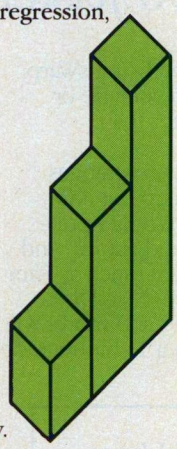

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also define the degree of pitch bend (which "bends" the pitch of a note up or down) in a note in the instrument table.

The envelope comprises up to eight linear segments, each segment described by a level and a slope. The level is called a breakpoint, a linear amplitude of the sound. The slope is described by an increment either added to or subtracted from the current level. To play a note with the note synthesizer tools, then, you must first have available (besides the tools themselves!) an instrument pointer, the semitone number (a number assigned to a specific pitch), an understanding of the Freeform

You must use the sound tools Apple provides to create sounds.

Sound Player tools, an understanding of the Tool Locator, access to the Memory Manager, and the instrument-definition table. Apple is currently working on ways to make all of this easier, by constructing more powerful tools for building the instrument tables.

Finally, to play a note, you start the synthesizer tools and then allocate a generator, get an instrument definition, play the note, turn it off, and deallocate the generator.

The Sequencer Tools

The sequencer tools, when they are available, will control the mixing of sound and the sequencing of notes and pauses—the things that make up the complex structures we call music. (Watch for a tutorial on this topic in an upcoming issue.) They will allow you to play multivoice tunes and to synchronize them with other actions inside the machine—graphics in a game, for example. The sequencer tools will be able to play two types of music: quantized music, which is precisely based on quarter notes, eighth notes, and the like; and MIDI performances, which can capture (because they time everything, even mistakes) the essence of a musical performance (even irregularities and mistakes) and replay it. +

Rob Swigart is a Redwood City, California, author and software designer. For a preview of his new Activision game, see "GamePort" in this issue.

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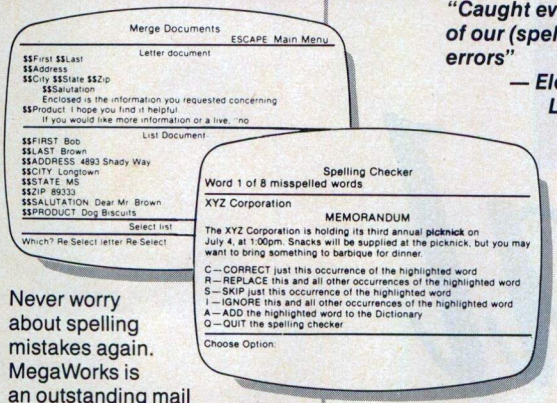

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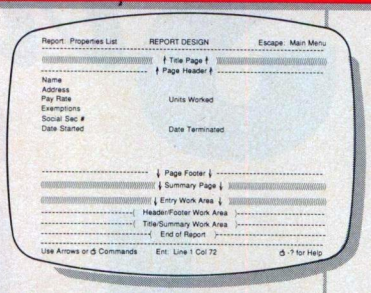

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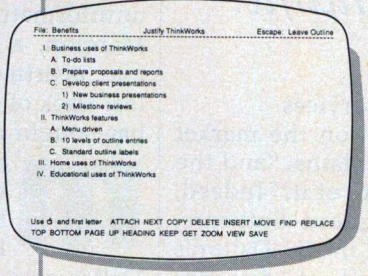

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Yet you might be wondering if buying mail order is a safe bet. You may have heard of mail-order companies that have been slow to fill orders. The truth is, though, that most mail-order transactions go smoothly. Still, you should know your rights and responsibilities.

In fact, the mail-order field is booming. Retail stores today sell no more than 35–40% of all business and productivity software, according to Bill Higgs of InfoCorp, a Cupertino, California, market-research firm. He says the large mail-order houses may sell the same amount. If we include games and add direct mail to the figure, half of all available software may now be bought through the postal services.

"There's no question the market is in flux," Higgs explains, "and the retail stores are aware of it." Indeed, chains such as Egghead Software, and Software Etc. in B. Dalton's bookstores now sell at discount prices too. "It's rare that you have to buy at list any more," he says.

The rise in mail-order business stems from at least two factors. First, the market has become much more knowledgeable, and fewer buyers seek or need the guidance of a retail salesperson. "Users who know what they want shouldn't have to pay list," says Mike Brown, president of Central Point Software of Portland, Oregon.

Second, most mail-order houses are reputable, and word of mouth is spreading. "I've had a very good experience with them," says Debbie Heuer, a civil-engineering consultant in Champaign, Illinois. "The closest we've ever come to being ripped off was in dealing with an uninformative company," says Edie Marglon, a San Francisco, California, apartment manager who has lost track of the number of times she has bought mail order.

Many firms work hard to win responses like these. Kay Riggs, president of Preferred Computing of Dallas, says, "In mail order, it's twice as important to have customers in mind, because they're nervous." In turn, repeat and referred customers are vital for giving a mail-order firm stability. A company such as Zimco International, Inc., of Queens Village, New York, which says that 80% of its orders come from referred buy-

ILLUSTRATION BY LISA DESIMINI

ers, is in a good position to outlast financial drought and can offer important extra services.

Mail order falls into two large categories. The first is direct mail, meaning that a manufacturer offers its wares directly to the public, generally at full list price. Central Point Software, for instance, sells only products it has built or helped build, including the Laser 128 computer, two Apple II disk drives, and its Copy II program. "People will be seeing more companies doing what we're doing, more and more manufacturers selling their own products by mail," says President Brown, who currently does about 30% of his business through mail order.

The second category is the discount house. These middlemen come in various forms, from mammoth price-cutters such as Programs Plus of Stratford, Connecticut; to small firms stressing quality such as Preferred Computing; to specialty houses such as Ribbon Land of Exton, Pennsylvania, which sells ribbons, and Unitech of Cambridge, Massachusetts, which emphasizes disks.

The competition is ferocious. "It's a cutthroat business," says Craig Zim, president of Zimco. "Customers will come to you for a dollar less." The firms are under intense pressure to reduce prices, but the more they do, the fewer services they can offer and the closer they may come to insolvency during dry spells. "There are a large number of highly competitive firms that live on very low margins, that have nothing but price," says Brown. "It's going to be very difficult for all of them to survive."

Still, price is the mainspring of mail order. Discount houses offer items at up to 40% off retail, indeed at figures that seem almost suspicious. How do they do it? It's simple. They deal in volume. If they buy products wholesale, at the same cost as retail stores do, they can tack on a minimal markup. And since they can usually buy in bulk, they get even better rates. Retail stores typically lack the turnover to compete.

Moreover, sometimes they offer popular items as leaders. For instance, Zim says he'll buy a Hayes 2400-bps modem for $555 and sell it at $559. The profit margin on such a sale is negligible, but, as Zim notes,

"My hope is that the buyer will come back or that some organization will buy in quantity."

Beyond Price

Price is not the only reason to buy mail order. This buying method has other advantages.

One is availability. Mail-order firms offer a spectrum of products, including some items you simply won't see in the store down the block. Want a silver ribbon for your Epson? An orange one? You could canvas the retail stores for a long time before unearthing one, but you could call Ribbon Land and have one delivered in a few days.

Mail-order firms also sell complete Apple systems at a significant discount. Although Apple Computer has tried to prohibit the practice, such sales take place on what's called the gray market.

Shades of Gray

The gray market works like this. Some authorized Apple dealers purchase more computers than they can retail, to get the volume discount. They then "transship"—that is, sell the excess to mail-order houses, which in turn offer them at a price that undercuts Apple's.

"We don't think it's good for anyone," says Apple spokeswoman Marianne Lettieri. "We provide incentives so dealers won't transship. For instance, we let them send back their inventory. We're very serious about this. Dealers can lose their authorization. When there's a lot of transshipping, it hurts everyone because it brings prices down. And it's not always good for the consumers, because they can lose their dialogue with us."

Authorized dealers themselves cannot sell through the mail at all, because their contracts with Apple forbid it, and in June of last year, the 9th Circuit Court of Appeals upheld this provision in the face of a lawsuit brought by six dealers. Some dealers continue to transship, however, because it's simply more cost-effective than returning inventory.

Apple can do nothing about the mail-order firms themselves, which sell gray-market machines legally. One such company is World of Computers of West Milford, New Jersey. Mark Daniels, company president, says, "I see why Apple doesn't want a gray market. It cuts their prices. But then I find myself dealing with a serviceman in the Aleutian Islands who can't get a computer any other way."

This example points to still another advantage of mail order. It can be helpful to individuals who live outside large urban centers. Debbie Heuer, for instance, bought a printer, modem, and numerous programs through the mail. "This is Champaign, Illinois," she says. "There are some stores here, but most of them sell at list price."

Mail order is also physically easier. Instead of driving out to the store, you simply lift the receiver and dial a number. This kind of convenience matters particularly to the disabled and elderly. "For the amount I've spent advertising in magazines for the disabled, the return is very high," explains Mark Daniels. "Many paraplegics love computers. They can either sit in front of a TV, or they can get on a computer and contact people. It's a little like ham radio." Daniels also foresees an increase in mail order as the computer generation ages and becomes less inclined to leave the house and battle traffic.

The Down Side

Mail order clearly has disadvantages too.

First, it's buying blind. You can't actually see the product, hold it in your hands, and read the blurb on the cover. You can't talk to someone in person about the merits of different products. Hence, it appeals more to experienced buyers who already know what they'll be getting.

Second, you can't take the item right home with you. You have to wait. The drawback is partly psychological—no instant gratification—and partly practical. To minimize delays, some firms make special efforts

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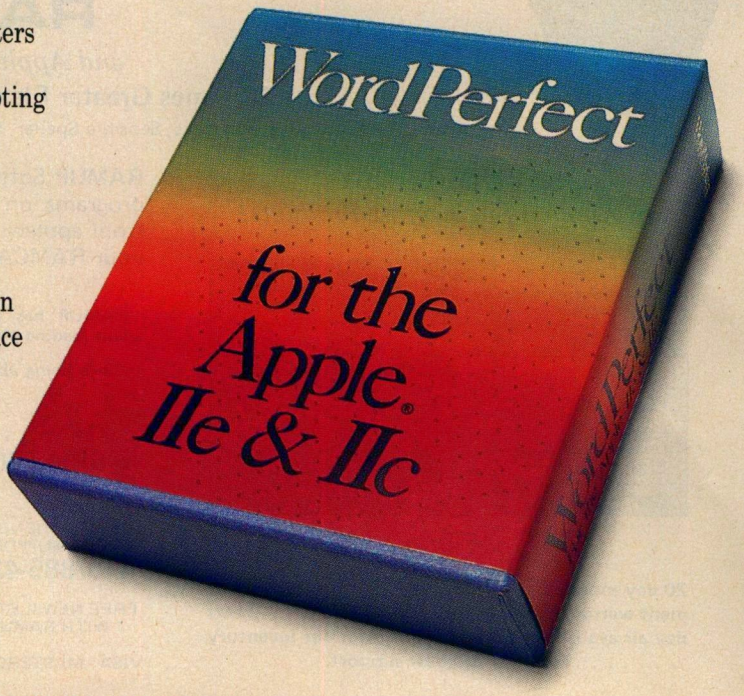


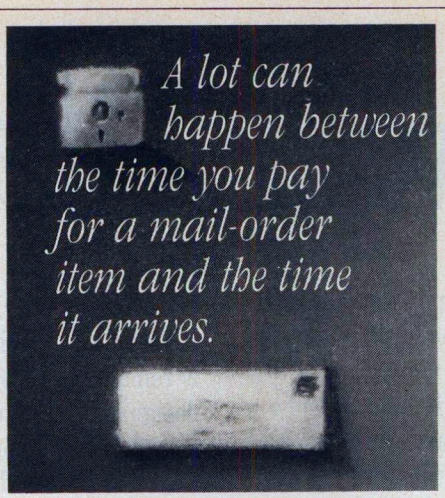
CIRCLE 118 ON READER SERVICE CARD

to ship quickly. For instance, Preferred Computing says that if it receives an order before 3 P.M., it ships it the same day by UPS Blue Label, a second-day delivery service. If you want it sent overnight, the company will do so at cost, with no handling charges.

Third, service is less convenient. Many mail-order firms offer excellent service for their products, but you still may have to wrap the item up and send it back—it's easier to drive down to a local retail outlet.

To compensate, some firms hold out special inducements. Central Point Software maintains a $70,000 repair-parts inventory for its Laser 128 computer and offers 24–48-hour turnaround. World of Computers offers a technical-support number and a 90-day warranty on its gray-market Apples. Other firms give similar support.

Finally, it's harder to know the company itself, and a lot can happen between the time you pay for an item and the time it arrives. Premeditated fraud is not the main threat, although it has certainly happened. More common is the company that becomes overextended and finds itself in a vortex of debt. Such a situation can come up fairly easily, given the fierce price battles and the high cost of advertising. When the debts reach a certain level, service may become erratic, products may not arrive, and eventually the firm may declare bankruptcy.



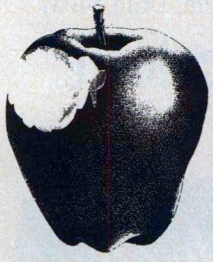
A prominent, recent example is that of Northeastern Software, which routinely ran expensive two-page advertising spreads in magazines and boasted that it would beat any other advertised price by a dollar. Northeastern offered special discounts for repeat customers and further discounts for buyers who circled items they wanted in magazine ads and sent them in. Its advertisements appeared regularly, and its size suggested a comfortable prosperity.

Yet, increasingly in late 1985 and into 1986, buyers who mailed checks to Northeastern had to contend with unfilled orders. Complaints began pouring into the Better Business Bureau, and it became clear—to insiders, at least—that the company was coming undone. Finally, in October 1986, the firm filed for Chapter 11 protection under federal bankruptcy law. The company said it is now trying to reorganize and may re-open its doors later this year.

Other mail-order houses are not pleased to see competitors going down in flames. "It's a shame there are companies like that," says Daniels, "because it hurts everyone else."

Possible Precautions

Most distributors are careful, and the chance of having a Northeastern-type experience is remote. But you still have to wonder how you can tell if a firm is dependable. Un-



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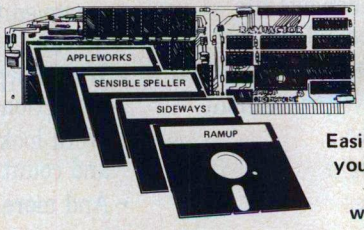

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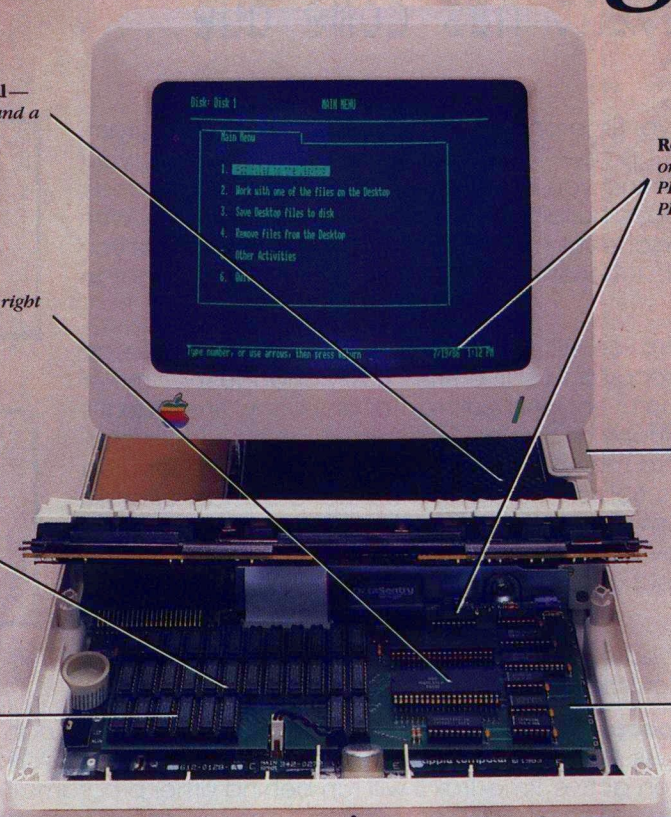

Real-time clock *displays time and date on AppleWorks™ screens and files, and is PRO-DOS compatible for use with other PRO-DOS software.*

Pinpoint's AppleWorks accessories *with RAM enhancement software—together a $118 value—only $79 if ordered with Z-RAM Ultra.*

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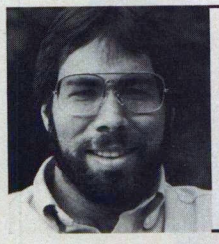

"I recommend Applied Engineering products wholeheartedly." (Of course, Steve's IIc has a Z-RAM installed.)

Steve Wozniak, the creator of Apple Computer

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With any Z-RAM Ultra, your AppleWorks word processor capacity will instantly increase from 2,250 lines to over 15,000 and the maximum number of records from 1,350 to over 25,000. Available desktop memory rockets to over 700K with *all* of AppleWorks loaded into RAM. Z-RAM Ultra even expands the clipboard and autosegments large files so they can be saved on two or more disks. Nothing else comes close to enhancing AppleWorks like this!

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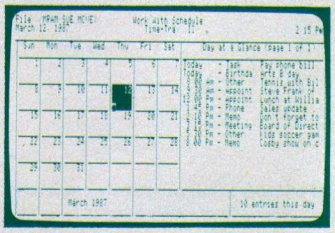
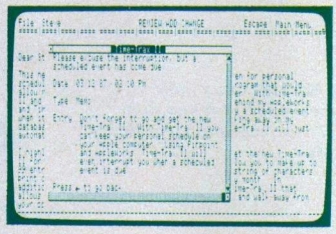
Time-Trax II

Please excuse the interruption, but a scheduled event has come due...

Time-Trax II™ is an active, time and date oriented calendar program. When a scheduled event is due Time-Trax II will beep and display your entry! Time-Trax II will remind you of meetings, appointments, errands, phone messages, birthdays, holidays, bills to pay and much more. With Time-Trax II you can even schedule advance notice reminders so that you are ready for your important event! No more excuses that you forgot to look at your calendar!



Time-Trax II is easy to use. With just a few simple keystrokes you can make, review, copy and edit entries. Easily change the time or date of an event and edit text of any entry. Time-Trax II's cut, copy and paste commands along with its clipboard makes it simple to enter regularly scheduled events. Search for any name, phone number or other information in any entry. Customize Time-Trax II with your own meaningful category labels for your entries. Print out a day, a month or any period of time easily. Keep schedules for any number of users.



And best of all Time-Trax II uses the AppleWorks™ user interface, so if you're using Appleworks you're ready for Time-Trax II!

Busy people everywhere need Time-Trax II. Time-Trax II can be installed as a Pinpoint Desk Accessory and then either run as a normal desk accessory or an active one! When active Time-Trax II will run behind other programs like AppleWorks, Manzanita BusinessWorks™ and Profiler™ and will actually interrupt you while you are working to notify you of a scheduled event!

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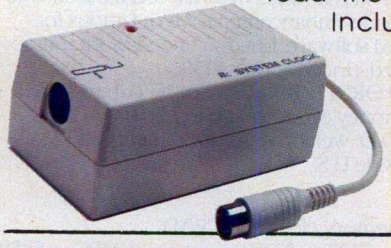

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Imagine having your Time-Trax II schedule loaded into a wrist watch. That's exactly what you get with the Seiko Datagraph 2001™. Now you can be anywhere and Time-Trax II will notify you of your important events with an alarm and display on an easy to read 4 line LCD screen. The Seiko Datagraph 2001 version comes complete with Time-Trax II, the Seiko Wrist Terminal (it's also a very nice watch) and a combination ProDOS clock/interface for your computer. No other cards or accessories are needed. We include everything you need.

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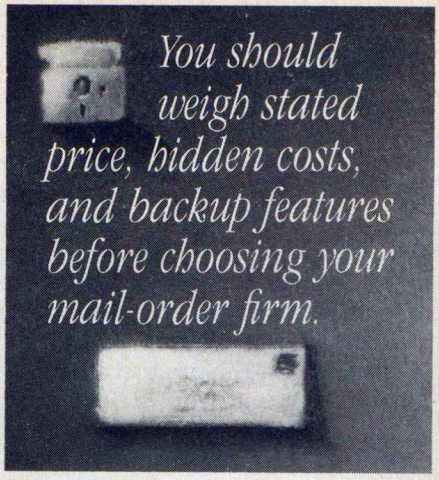
CIRCLE 159 ON READER SERVICE CARD

fortunately, there is no simple litmus test. You can, however, take certain precautions:

- Call the Better Business Bureau in the area where the firm is located. The bureau is likely to be able to warn potential customers away from a sinking company.
- Call the local Chamber of Commerce.
- Call the Regional Postal Inspector nearest the firm. There are five offices—Western Region: San Bruno, California (near San Francisco); Central Region: Chicago, Illinois; Southern Region: Memphis, Tennessee; Eastern Region: Bala Cynwyd, Pennsylvania (near Philadelphia); and Northeast Region: Newark, New Jersey.
- Exercise a little discretion with any firm that offers noisily promoted discounts. "Northeastern always said, 'We'll undercut anyone by a dollar,'" says Joe Coyne, part-owner of Ribbon Land. "I won't. But I plan on being around for a while."
- Don't leap in with a $10,000 order. Start with a small one and see how the company handles it.
- If you are really uncertain, buy from a mail-order firm within your state. You have a much better chance of recovering money from an in-state company.



Of course, dependability isn't the only consideration in choosing a firm. You should understand exactly what each one offers you, weighing stated price, hidden costs, and backup features before making your decision. If the following variables aren't specified in an ad, ask about them on the 800 line:

- Product price—it's important, but don't let it carry you away.
- Shipping cost—some companies ship free; others charge a small sum.
- Sales tax—if you buy in-state, you may have to pay a little extra to the governmental system that protects you. Think of it as insurance.
- Delivery time—some firms ship in two days, or even one. Most take longer. The company that specifies a deadline must meet it. If a firm doesn't set one, the Federal Trade Commission gives it 30 days to put the product in your hands. Otherwise, it must send you a notice and offer you the option of dropping the deal. If you cancel, the seller must refund your money within seven days. According to Ann Guler of the FTC's Los Angeles regional office, the 30-day rule applies only to orders placed by mail, not to credit-card transactions over the phone. You can use the phone and still gain the benefit of the rule, however, by mailing a written confirmation of the order to the firm.
- Mode of payment—giving your credit-card number out over the phone may confer two boons: hastened delivery and the help of the credit-card company and erasure of the debt if the goods fail to material-

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We know that most people are turned off by this approach, but if you are ever tempted by imitations of our products that claim to be compatible, give us a call. Whether you're concerned about performance, compatibility, service, or price, you'll discover why we outsell all the rest.

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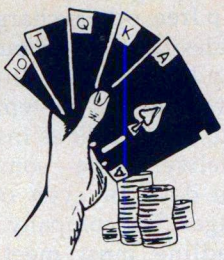

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☐ 038 Budgeting calendar, calculator $5
☐ 039 General ledger, 15 financ. programs . . $5
☐ 045 House sale calculations, payroll $5
☐ 051/052/053 Relational database, 80 page document (on disk) $15
☐ 056 Check balancer, w/documentation . . . $5
☐ 057 Omnifile database, w/documentation . $5
☐ 404 Family Finance, amortization, acctg . . $5
Education
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☐ 062 Alphabet, spelling, word games $5
☐ 064 Drills: typing, spelling, states $5
☐ 065 Talking calc., math, flash cards $5
☐ 066 Teaching aids, grade averager, tests . $5
☐ 068 Story problems, metrics, history $5
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DEALER INQUIRIES INVITED

ize (see "When Mail Order Goes Awry," which accompanies this article). A few firms charge extra for credit-card use, though, to cover their costs. Also, abuse of credit-card numbers, although rare, does occur. The most common scam is billing the card long before actual shipment, to skim the interest. Checks and money orders are in some ways safer but may delay delivery. Never send cash.

- Warranties—the product should be guaranteed free from defects for a reasonable time, usually 60 to 90 days.
- Service—look for toll-free technical-support hot lines, preferably with 24-hour service. Make a particular effort to understand the warranty and service contract with gray-market Apples, as the manufacturer does not back these machines up.
- Guarantee of subjective satisfaction—some companies will replace an item free within a certain time if you are dissatisfied with it for any reason. Others will replace it, but pass along the manufacturer's handling charge. Still others simply refuse to take back a working item that displeases you and you alone. Ask beforehand.

Once you've decided on a product and a company, you're ready to place the order. Be sure to keep a record of it, including the company's name, address, and phone number, and a description of the item and terms of sale. Photocopying the ad and order form is generally sufficient. If you order by phone, fill out the form anyway. Without some evidence of the transaction, proceeding with a complaint is difficult.

Recourse

No amount of care completely eliminates problems. If something does go wrong, follow these steps in order: First, and always, contact the firm. Innocent errors can happen to anyone. Occasionally even the most diligent firm runs out of an item and has to reorder it, causing delay. Products can get lost in the mail. The company may not know the item you received is defective, in which case it should offer a replacement at no cost. Give the firm a chance.

If the company responds inadequately to your complaint, you can get a third party to intercede on your behalf. Parties that can help you out include the Direct Marketing Association; your state Department of Consumer Affairs; the Regional Postal Inspectors; and, in some cases, your credit-card company.

The Direct Marketing Association (DMA), 6 East 43rd Street, New York, New York 10017, is the oldest and largest trade association serving direct mailers. It was established in 1917 and has more than 2900 member companies. It maintains a Mail Order Action Line or MOAL ([212] 689-4977), and its representatives work with you and the company to resolve your dispute. The DMA has no enforcement powers, however.

Your state department of consumer affairs and the regional postal inspectors are government agencies. If they intercede, you will normally have the weight of government authority behind you, plus an attorney explaining legal niceties to your antagonist. These bureaus will not bring an action for you, unless they have had a landslide of complaints. Moreover, the Postal Inspection Service will not file suit unless it can allege mail fraud—that is, that the company deliberately set out to bilk you. It can be hard to prove.

Notify certain agencies of your problem, to alert future buyers. Contact the Better Business Bureau and the regional postal inspectors nearest the firm. You may also want to notify local computer clubs and magazines you subscribe to.

In addition, if the company has violated the 30-day rule, talk to the Federal Trade Commission office nearest you. Again, the FTC probably won't bring an action for you, but it does look for patterns of wrongdoing and will lend you an interested ear. Sufficient complaints will spur it to file charges, but even then the effort will probably stop only future violations, not compensate you for past ones.

Few mail-order transactions ever reach this crisis point. By far the majority of such transactions satisfy all concerned. Partly as a result, the field is thriving, and more and more individuals are letting the mail carrier do the walking. "We've gotten orders in crayon: 'Please send me a joystick,'" says Craig Zim. "People aren't frightened any more." ✚

Dan McNeill is coauthor of Computer Sense *from Bantam Books.*

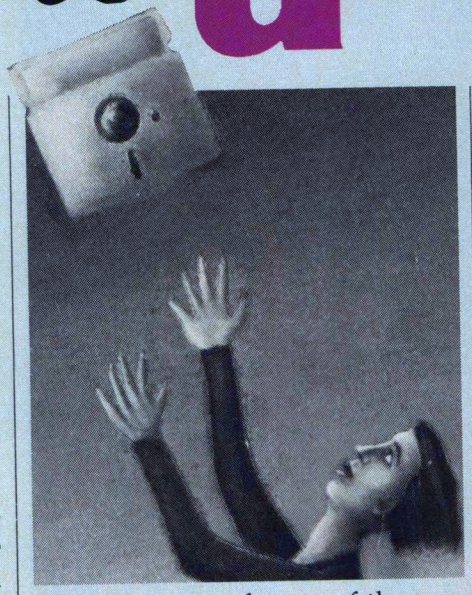
CIRCLE 256 ON READER SERVICE CARD

when mail order goes awry

Most readers have ordered computer-related gear through the mail at one time or another. The computer industry is particularly reliant on mail-order marketing, due to the youth of the industry and the number of new hardware and software products that enter the market each year. In fact, the first mass-distributed personal computer, the Altair, reached most of its eventual owners by mail.

American consumers appears to be well protected against unfair commercial practices of mail-order outfits. A combination of state and federal laws govern every aspect of mail-order operations. Taken together, these laws seemingly prohibit deceptive advertising and other fraudulent practices, require prompt action by mail-order businesses on consumer orders and refunds, and allow consumers full recourse if a product doesn't work the way it's supposed to.

Nevertheless, most of us intuitively realize that customer recourse is limited if something goes wrong in a mail-order transaction. It's one thing to part with $500 at your local computer store, where real people can respond if you are unhappy with the product. It's quite another matter to resolve disputes with an 800 number or P.O. Box in a state 3500 miles away. This gut perception that all may not be well if a mail-order vendor fails to deliver a quality product in time is all too true. Despite seemingly good consumer-protection laws, you actually have only limited legal recourse if something goes wrong, for several reasons.



Enforcement of many of the consumer protections is in the hands of overworked and understaffed federal and state agencies that have no jurisdiction to seek justice for individual consumers but are charged with protecting the public in general. For instance, you can complain to the U.S. Postal Service if you believe a mail-order business is guilty of fraud. The Post Office may try to close down the offending business, but it won't get your money back for you.

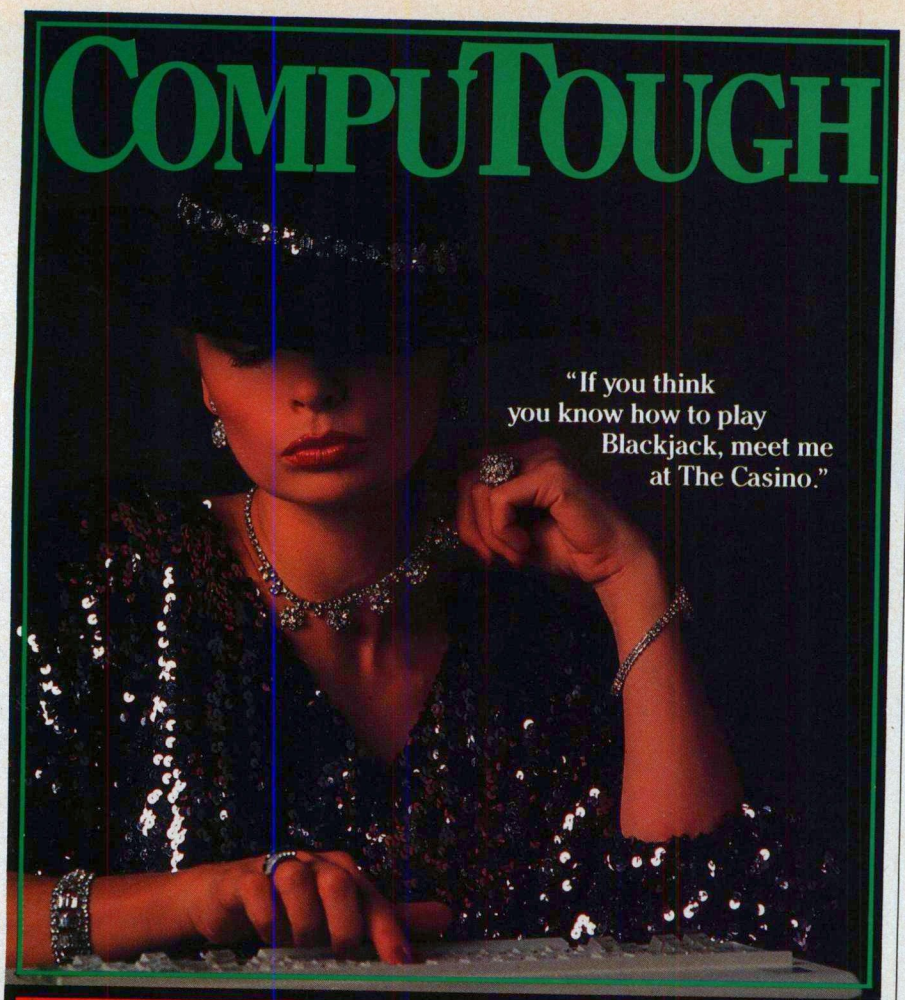
If consumers try to file a court action to obtain legal relief, they are likely to find that they have entered a Kafkaesque maze—unless the mail-order business is located within their state of residence or is registered with the Secretary of State as doing business there. In that event, small-claims court (or perhaps a consumer-oriented law firm that will file in formal court) makes adequate relief feasible.

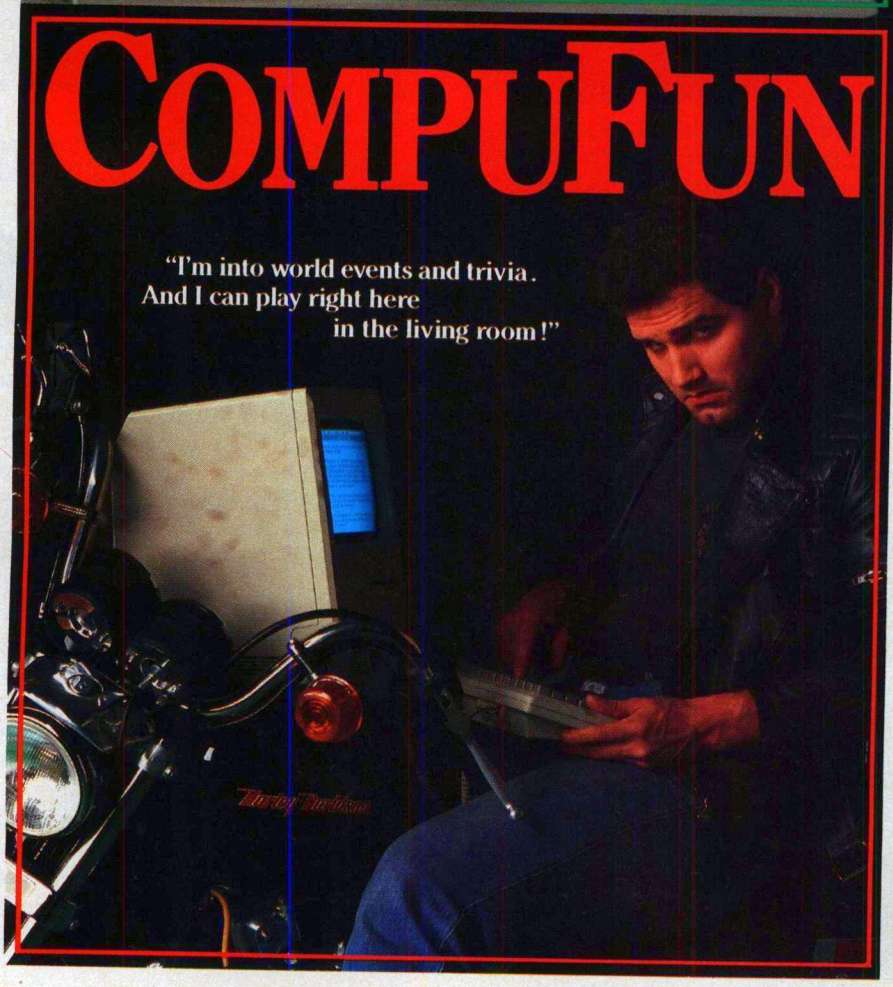
Unfortunately, most mail-order businesses will be located far from your state's borders and will not have registered to do business in your state, so you have two choices: file a lawsuit in the other state and present your case there (probably impossible) or try to get a court in your state to assume jurisdiction over the out-of-state (and unregistered) business. Without going into all the reasons why, the latter tactic is legally extremely problematic, expensive, and certainly more costly than the $1500 or less involved in the typical mail-order dispute.

So much for the negatives. Now let's look at a few things you can do if you feel cheated in an out-of-state mail-order transaction. (See "Such a Deal" for further tips.)

Suppose you have paid for your item with a credit card and haven't received it by the time it shows up on your credit-card bill. If the item costs more than $50, notify the credit-card issuer by letter (keep a copy) that, under 15 United States Code Section 1666(i), you refuse to pay for the item because it wasn't delivered as promised by the business. The credit-card issuer will in turn notify the business. If the business doesn't dispute your position—and it shouldn't if it hasn't shipped the goods yet—your credit-card account will be credited accordingly. If the company notifies the credit-card issuer that the goods have been shipped, you will be rebilled. Assuming you have received the goods in the meantime and they work as they are supposed to, you should have no problem.

Suppose, though, that the goods are delivered but don't work, or work poorly in light of advertising claims or representations in the manufacturer's materials accompa-





nying the goods. In either case, you can assume that you are entitled to return the goods under express- or implied-warranty principles (I discussed these in "How to Get What You Pay For," *A+* January 1986, page 60).

If you have paid with a credit card, the way you claim your warranty protection is easy. Simply refuse to pay the card issuer and explain why. If the item doesn't work, send it back to the distributor by registered mail or parcel service. If the item does work but poorly, accompany your refusal-to-pay letter with an explanation that you will return the goods when the card issuer agrees to credit your account.

If the business disputes your position and demands payment from the card issuer, the issuer will probably demand payment from you. Although you are theoretically entitled to maintain your position of nonpayment, you may well lose your credit card in the process. Simply stated, if the bank doesn't credit your account, you will probably want to pay up rather than fight.

One note of caution: The federal statute that created this remedy for credit-card shoppers is ambiguous about its coverage. In most mail-order situations involving national bank cards, the statute applies only when the business is in your state or when the "transaction" occurred within 100 miles of the consumer's residence. But neither the statute nor the courts have defined whether the transaction occurs where the purchaser lives or where the mail-order business is located. If the former case is true, then the no-pay rule works in mail-order transactions. If, however, the transaction occurs where the mail-order firm is headquartered, then it doesn't.

Rather than worry too much about this point, I suggest you assume that the statute applies to your situation and refuse payment as I've indicated. Let the card issuer or business argue the other approach if they disagree with you. And, as I've indicated, you can always pay if and when you are rebilled.

What happens if the goods you receive fail to work after you have paid the credit-card company or your check has cleared? Probably your best remedy is one based on business rather than legal principles. As "Such a Deal" points out,

several agencies and organizations can receive official complaints. Before contacting them, however, you can write the business a letter specifying to whom you will complain if you don't get satisfaction.

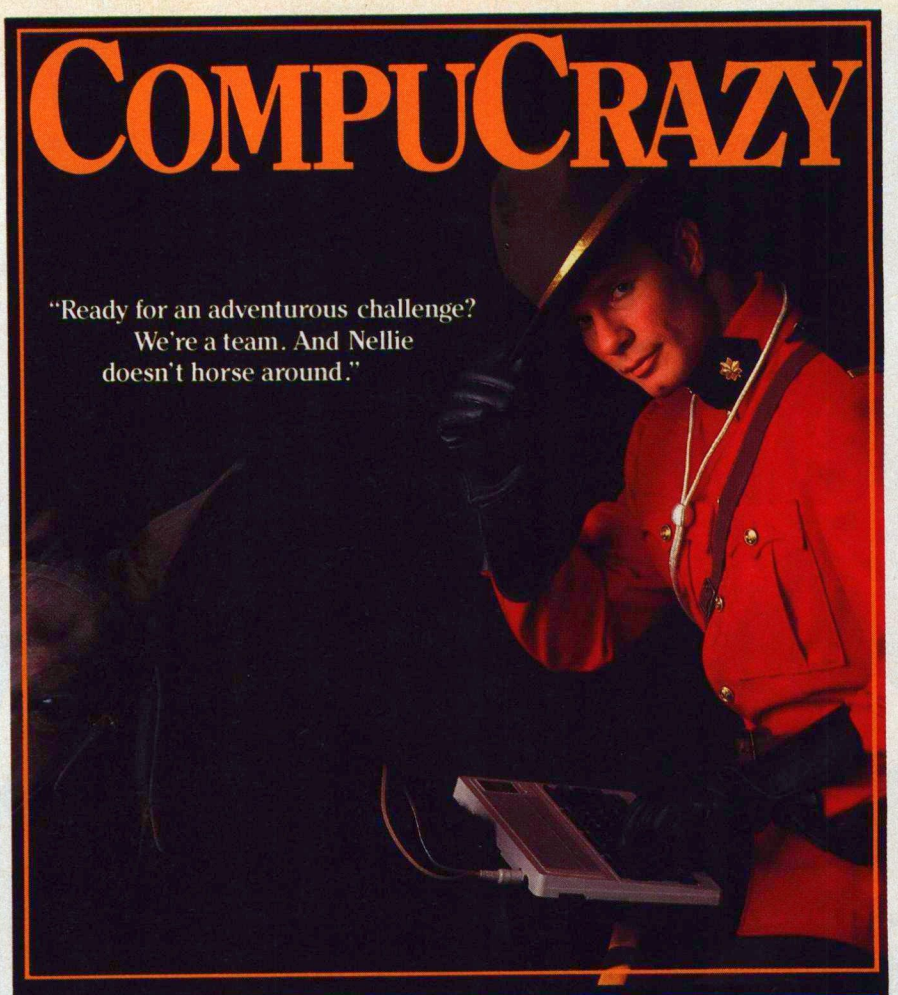
If this letter doesn't produce results and if the additional steps suggested in "Such a Deal" aren't successful, you should next inquire of your state's Secretary of State about whether the mail-order company is registered to do business there. If it is, you can use your state's small-claims court to obtain an inexpensive and quick judgment, even though you may have some trouble collecting. If the business isn't registered in your state, you will probably not be able to have your case heard in that forum.

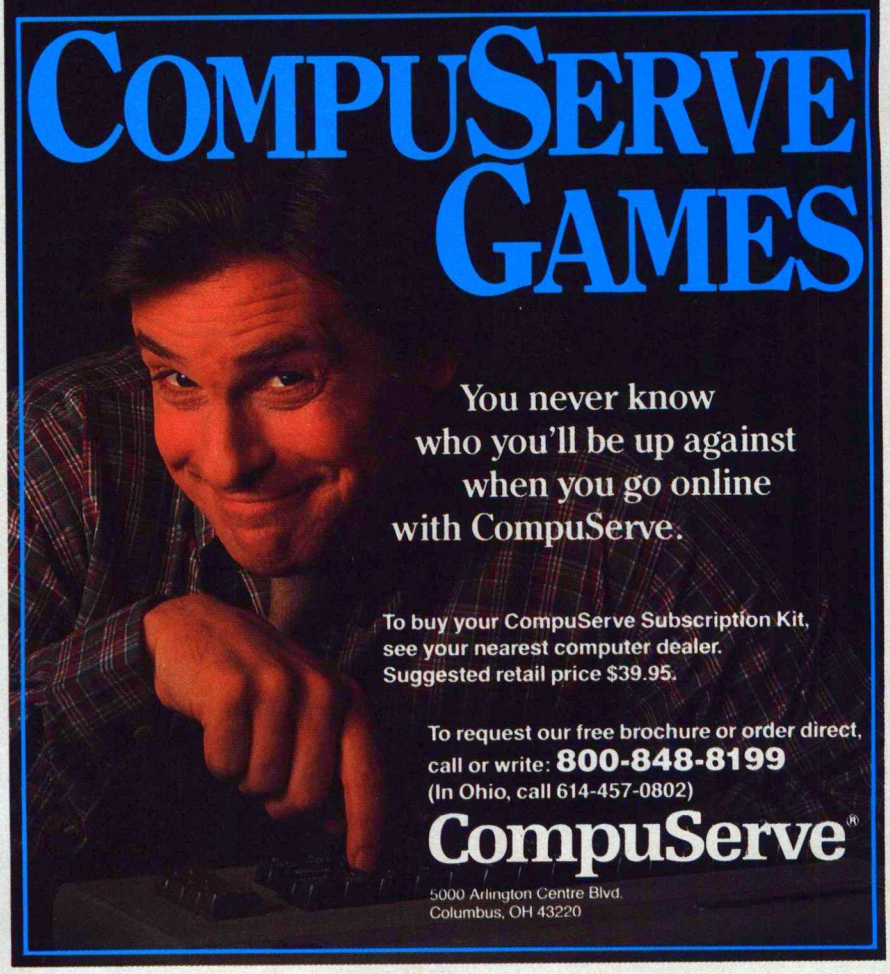
What happens if a company is economically unable to pay a consumer back, even though it wants to or is ordered to by a court or agency? Such is the case with at least one large software mail-order house, Northeastern Software, Inc., which filed for protection last fall under Chapter 11 of the U.S. bankruptcy laws. Under Chapter 11, a business may continue its operations but must pay its creditors according to a court-approved plan. If a business is unable to continue operations, the bankruptcy proceeds under Chapter 7 and the business's assets are sold and distributed to the creditors according to certain criteria.

If you believe a mail-order house owes you money (either because merchandise wasn't delivered or because it was defective), make sure you state your position in a letter to the company. If you then hear that the company has filed for bankruptcy, send a copy of your earlier letter to the court where the bankruptcy has been filed. These letters will put you on record as a creditor and perhaps entitle you to payment of at least a portion of what you're owed. Just what percentage of your claim you will recover (if any) depends on such factors as the number and type of creditors (some have priority over others), the company's relative economic strength at the time the petition is filed, how rigorous the plan is, and whether the company survives under the plan.

Steve Elias

Steve Elias is a San Francisco attorney and freelance writer.





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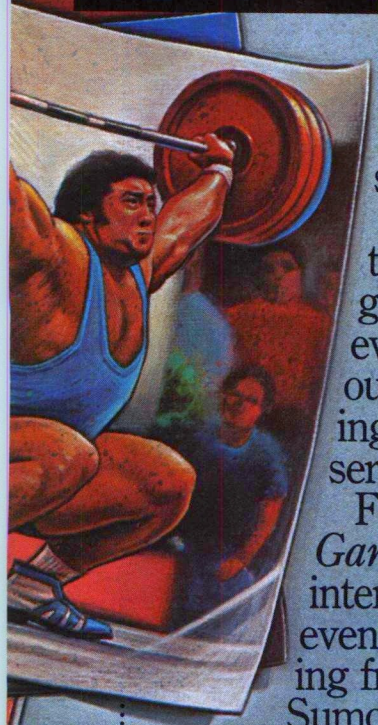

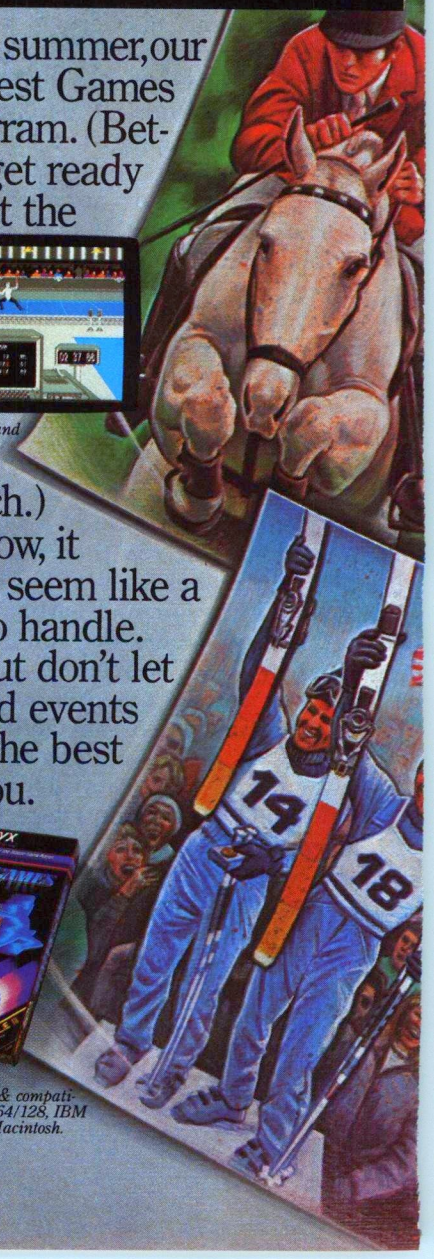

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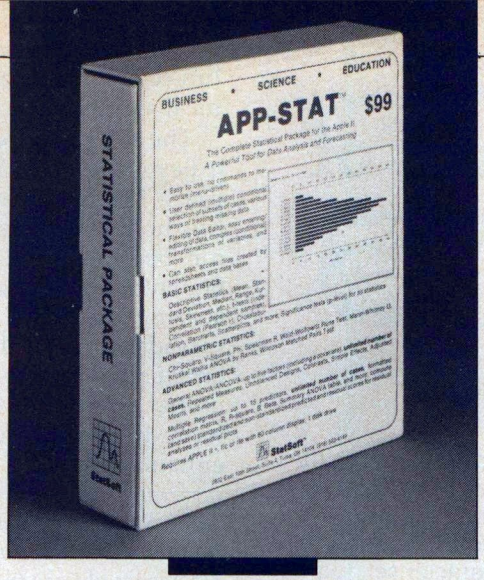

Quick Take

BY MIKE MARKOWITZ

APP-STAT

A complete statistical package for Apple II computers

The study of statistics began back in the 17th century, when mathematicians began to analyze games of chance. Since then, statistics has been an important tool for biologists, psychologists, economists, and industrial quality-control managers (to name just a few). The goal of the statistician is to reduce an enormous heap of numbers to a few simple answers—to find the meaning that is hidden in the data.

Computers in the Apple II line are not very powerful number-crunching engines compared to newer 16- and 32-bit machines, such as the IBM PC or the Macintosh. Nevertheless, most popular statistical procedures can be programmed readily in Applesoft BASIC, and they can run reasonably quickly on even a 64K machine as long as the size of the data set is not too great.

App-Stat, from StatSoft of Tulsa, Oklahoma, is billed as a "Complete Statistical Package for Apple II Computers." Release 1.1 is reviewed here. The package requires one disk drive and an 80-column display. The disk is not copy-protected, and users are encouraged to make working copies. App-Stat works with a printer in slot 1 but needs some minor patching to work with the "programmable" printer-interface cards such as The Grappler, Dumpling, or Microbuffer II.

BASICally Slow

Because App-Stat is written entirely in BASIC, it executes rather slowly, compared with programs that use machine language for calculations. On the other hand, users with the knowledge and the inclination to customize their software can easily list, examine, or modify all the App-Stat code.

The package comes in DOS 3.3 format, but instructions are included for converting it to run under ProDOS. In either case, App-Stat is not self-booting, because the program files leave no room on the disk for the operating system.

Users can access all of App-Stat's features from a main menu containing 16 options. It provides every statistical procedure covered in college-level introductory statistics, including descriptive statistics, t-tests, correlation, ANOVA and ANCOVA (analysis of variance and covariance), and multiple regression. It also has a good selection of "nonparametric" tests (statistics that work especially well with small samples and "fuzzy" data).

App-Stat has only limited graphics capability. It can display and print simple bar graphs and scatter diagrams, but users have no control over formatting, except for the choice of a heading.

Most of the work in using any statistics package is devoted to keying in the raw data and manipulating the data files. App-Stat provides for easy data editing. Data is organized into "cases" and "variables." For example, in a school class, each student can represent one case, and each test during the term can be a separate variable. One particular student's score on the mid-term exam can represent a single "data point," or item.

App-Stat uses a simple array file structure: each data item must be followed by a carriage return. It has utilities for converting data into plain ASCII files or "rectangular" files used by certain spreadsheets. Unfortunately, App-Stat is not compatible with any of the file structures acceptable to the AppleWorks spreadsheet module.

Notebook Labels

The package has no provision for variable labels or value labels, which make it easy to interpret pages of output. Users must record what the numbers mean in a notebook somewhere. All data is represented in App-Stat as single-precision real numbers, and you get nine digits of precision whether you want that many decimal places or not.

The documentation is packaged in a clothbound slipcase and runs to 144 pages in a three-ring binder. The manual is quite technical and assumes a thorough understanding of statistical theory. For explanations or help in choosing the right procedure, users are referred to standard textbooks. The manual has no bibliography or index. Registered owners are eligible for a discount on

future upgrades and telephone technical support (not toll free.)

The $99 list price of App-Stat puts it beyond the reach of some Apple users. The lack of any tutorial or online help feature makes it unsuitable for beginners. In future releases, StatSoft should provide a utility for sharing files with the AppleWorks spreadsheet module. Still, I can recommend App-Stat highly for expert users, especially those willing to write their own customized BASIC enhancements. +

Mike Markowitz is a computer engineer for a Southern California aerospace firm. He has taught graduate statistics and research design.

PRODUCT INFORMATION

App-Stat
StatSoft
2832 East 10th Street, Suite 4
Tulsa, OK 74104
(918) 583-4149
List Price: $99
Requires: Apple II Plus, IIe, or IIc; 80-column display; one disk drive; printer optional

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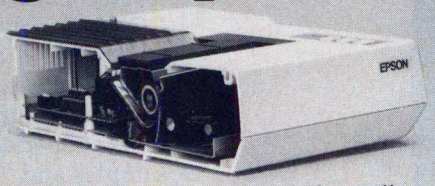

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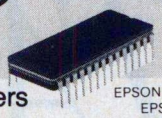

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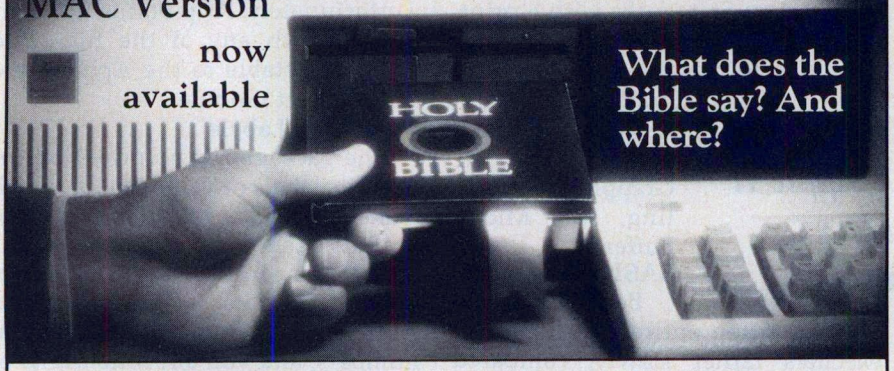

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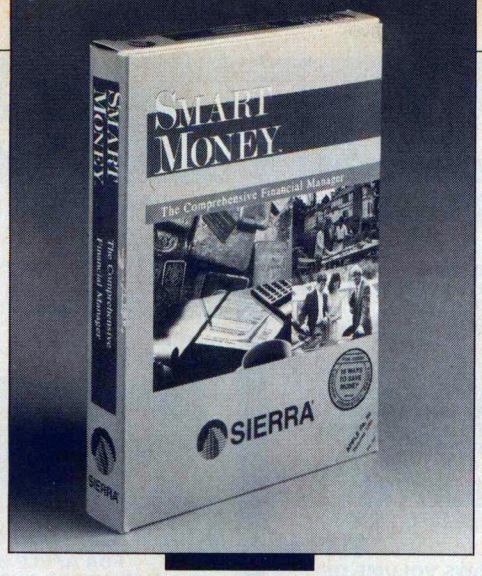

Quick Take

BY KENNETH M. LANDIS

SMART MONEY

Sierra On-Line is best known for entertaining Apple enthusiasts with its extensive library of games. On the more practical side, the company also sells Home Word, a word processor, and now Smart Money as well, a personal-finance program.

Smart Money is designed for "average" Apple owners. The program's documentation provides a brief description of accounting terminology and some basic accounting guidelines to help you get started. One stumbling block you will find immediately is the commingling of IBM and Apple terminology in the documentation.

An inexpensive personal-finance program for 'average' Apple users

The program uses Macintosh-like icons, or pictures, rather than text for its menus. You can navigate quickly to any given part of the program without going through the entire menu structure. It provides prompting messages at the bottom of the screen and has an on-line help feature.

Your first task is to define your personal list of accounts. You don't have to start from scratch, though, because Smart Money comes with a basic list of accounts. By editing these, you can easily come up with your own customized set—assuming that your finances don't rival those of the World Bank.

Smart Money uses two basic account types—regular and summary. A regular account might be an account for your MasterCard, whereas a summary account might total up all your credit cards. You can easily edit, move, or delete both of these accounts within the program.

Once you have set up all of your accounts, Smart Money is ready to receive your transactions. As you enter a transaction, you must identify which account it should be applied to. You can scroll through the account names, or Smart Money can find them if you enter either their full name or the first few letters.

As you enter each of your transactions, such as loan payments, deposits, cash withdrawals, and so on, Smart Money displays an entry form that is special to that transaction type—you don't have to skip around blank fields on a general screen.

The program uses standard double-entry bookkeeping. Thus, for each transaction or entry, there must be a balancing counterentry. Let's say, for example, that you paid a $100 electric bill by check. The $100 would be taken out of your checking account. On the "other side" of the transaction, you could charge your home-heating account with $40, with the automatically computed balance going into your home-lighting account. You can break up each transaction or distribute it into multiple accounts. You can also mark tax-related transactions with a tax field so that you can then easily list these transactions for tax purposes.

Smart Money also handles stock purchases, loans, retail sales for small businesses, and asset depreciation. For recurring transactions, its automatic-transaction feature allows you to process these transactions each month with only a few keystrokes.

The program has a host of helpful utilities and can print checks, using check stocks that are suitable for tractor feed into your printer. An added feature: Not only can it help you pay your bills, but it can also help you budget them. Its built-in financial calculator can analyze loans by creating an amortization table, calculating compound interest, or looking at annuities.

The reports Smart Money can produce include balance sheets, profit-and-loss statements, a chart of accounts, transaction journals, actuals vs. budget reports, and investment reports. It can also produce simple graphs.

If you want to get your finances in order using the power of your Apple and very little money, then it's smart to spend money on Smart Money. More advanced, more complete programs are available, but they cost considerably more. If you're an "average" user, Smart Money is more than enough. ✚

PRODUCT INFORMATION

Smart Money
Sierra On-Line
P.O. Box 485
Coarsegold, CA 93614
(209) 683-6858
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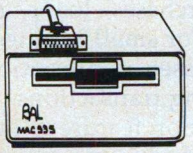

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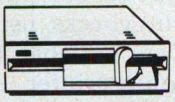

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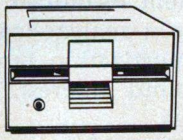

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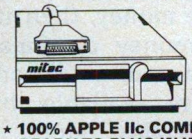

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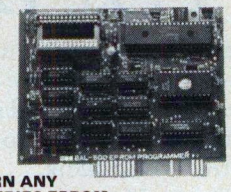

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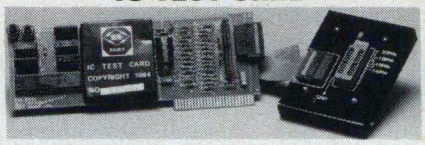

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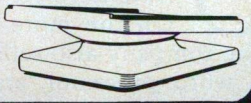

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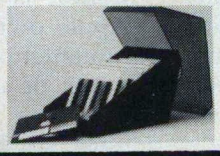

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CIRCLE 167 ON READER SERVICE CARD

USER REPORT
TAX INVENTORY

SHORT REPORT
USING SPREADSHEETS TO PRINT FORMS

HELP FILE
QUESTIONS FROM OUR READERS

A+ APPLEWORKS REPORT

This month's AppleWorks Report tells you how to set up a tax inventory database with AppleWorks and gives a short lesson on using spreadsheets to print forms.

USER REPORT *BY ROBERT L. TIGHE*

TAX INVENTORY

Whether you own your business or simply spend some of your own money for equipment you need at work, the IRS does not allow deductions for such expenditures unless you have kept fairly accurate records of them. Such records, if well organized, also help you when it comes to filling out your tax forms. Written notes and a filing system are helpful, but a computerized database lets you quickly find and organize the information you need.

An inventory database should contain all the information you need to keep track of current supplies. To be useful around tax time, it should allow categorization of records by their tax status and usage and also hold information about depreciation, where applicable.

To begin, give the database file a name that makes sense to you (mine is creatively called Tax Inventory). Then type the following category names:

Item Name	Purch Date
Mfg/Model	Years Depr
Serial No	Purch Cost
Stock No	Amount Depr
Location	Curr Value
Use Code	Supplier
Tax Code	Address
Qty/Case	City
Stock Qty	ZIP Code
Purch Qty	Catalog No

Most of these categories should be self-explanatory. Item Name contains a description just long enough to distinguish the item from other items. It can be as short as *typewriter* or as long as *bond paper fanfold 25% rag lt blue*. Serial No is the manufacturer's code number, and Stock No is your own inventory control code. Location can be the name of the room in which you keep the equipment, or it can be a location code for a shelf in your storage room.

In Use Code, I use three-letter codes for four different item categories:

Bld=Building Improvement
Equ=Equipment & Furniture
Inv=Merchandise Inventory
Sup = Consumable Supplies

A service-only business might never use the Merchandise Inventory category, which is for goods that will be sold and materials used in making such goods. All businesses, however, have Consumable Supplies, which are materials used to organize, advertise, and document business operations (i.e., office supplies). If you pay for any building improvements, such as carpet or paint in your office, you will want to include these as potential assets and/or deductible expenses.

The Tax Code category divides my inventory into three subcategories (see figure 1):

E=Simple Expenditure
D=Depreciable Expense
DA=Accelerated Depreciation

```
File: Tax Inventory              REVIEW/ADD/CHANGE              Escape: Main Menu

Selection: All records

Item Name        Mfg/Model      Serial No   Stock No Location  Use Code  Tax Code
==========================================================================
Typewriter       Xerox 620      T039281     M2054    Office    Equ       DA
Computer CPU     Apple IIe      A06021      M2050    Office    Equ       DA
Monitor          Apple II       80839261    M2051    Office    Equ       DA
Disk Drive       Apple DuoDisk  A059204     M2052    Office    Equ       DA
Computer Desk    Hatchet Techn  MN0946A     F2056    Office    Equ       D
Fanfold Paper    Strathmore     -           C31041   P8        Sup       E
Fanfold Paper    Strathmore     -           C31041   P8        Sup       E
Bond Paper       Strathmore     -           C20931   P10       Sup       E
Photocopy Paper  Mead           -           C24071   P10       Sup       E
Labels 1" x 3"   Avery          -           C19034   R5        Sup       E

--------------------------------------------------------------------------
Type entry or use @ or  cmds                                  @-? for Help
```

Figure 1: Sample tax-inventory database in multiple-record format

```
File: Tax Inventory              REVIEW/ADD/CHANGE              Escape: Main Menu

Selection: All records

Record 5 of 10
==========================================================================
Item Name: Computer Desk                  Serial No: MN0946A
Mfg/Model: Hatchet Technologies           Stock No: F2056

Location: Office                             Qty/Case: -
                                             Stock Qty: -
   Use Code: Equ
   Tax Code: D                               Purch Qty: 1

Purch Date: Jan 12 85                     Purch Cost: 428.19
Years Depr: 1                             Amount Depr: 42.82

                                          Curr Value: 385.37

Supplier: Wild West Office     Address: 1889 Pine Street, NE
   Catalog No.: 19-21965       City: Albuquerque NM          ZIP Code: 87100
--------------------------------------------------------------------------
Type entry or use @ or  cmds                                  @-? for Help
```

Figure 2: Sample tax-inventory database in single-record format

Your choice (based on IRS rules) determines the category for each item and the percentage of the purchase cost you can deduct each year.

The category Stock Qty should show how many units (items or cases) you have in stock, and Purch Qty indicates how many units were purchased on the Purch Date, the day the item was purchased. The amount you paid for the units goes into Purch Cost.

If the cost of the item must be depreciated, you will also want to keep track of the number of years you have already used it as a depreciated deduction (in Years Depr) and the amount that you've already deducted from the original cost (in Amount Depr). To find the remaining value of the item for tax-deduction purposes, simply subtract Amount Depr from Purch Cost. You can have the computer do so by printing a report with a calculated column or do it yourself with each individual record. You can simplify single-record subtraction—and data entry in general—by rearranging the layout of the single-record entry screen, using open-apple/L, as in figure 2.

Add the appropriate information to the database for everything you use and maintain for your business or work activities, and you will have a useful file from which you can sort, search, select, and print any records the IRS may require—quickly and easily. ✚

Robert Tighe lives in Albuquerque, New Mexico, and teaches computer applications to high-school and community-college students.

TEMPLATES

APPLEWORKS TO THE RESCUE

You can use AppleWorks in many ways to help make your tax preparation as painless as possible. See this month's cover story, "Making Taxes Less Taxing," which includes a review of two AppleWorks templates.

SHORT REPORT

BY CHRISTOPHER VAN BUREN

USING SPREADSHEETS TO PRINT FORMS

Forms play a big role as official documents in business communication. They also serve another purpose, simplifying the gathering and analysis of information.

The function of a form is to hold information in predictable places. When you glance through stacks of identical forms, you can easily search for a particular piece of information because it appears in the same spot on every form. Thus, forms serve to speed up the processing of information.

When it comes to processing forms, however, AppleWorks users are a bit shorthanded, since AppleWorks does not accommodate forms very well. Wouldn't it be handy if you could fill out records in the database by entering information onto a form layout or if you could print data onto any kind of form from the database or spreadsheet modules?

In fact, the spreadsheet module can help you accomplish these tasks. Using that module, you can set up a form for both data entry and printing, and you can move a spreadsheet form into the word-processing module for increased printing freedom.

Combine these techniques with AppleWorks print-enhancement programs, and you can work some small wonders. Some samples of the forms you can create in the spreadsheet appear in figure 1 on the following page.

Here's more you can do with the new Apple II.

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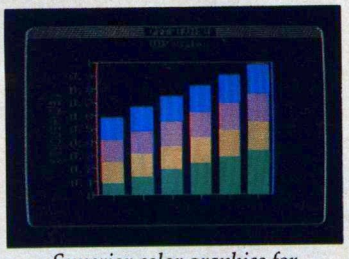

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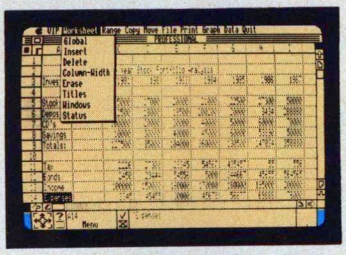

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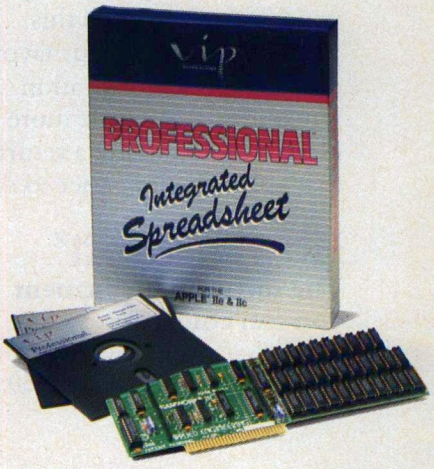

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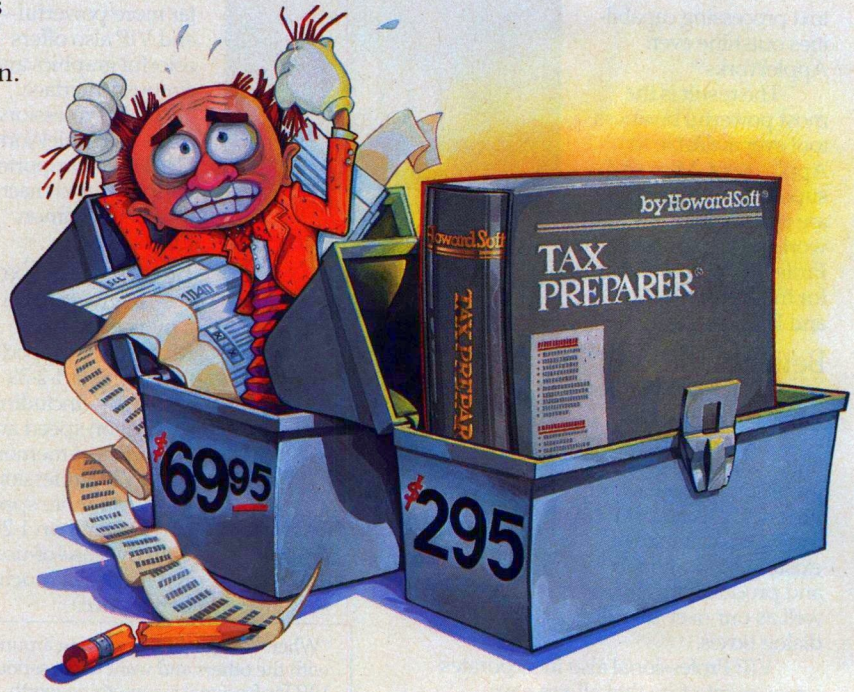

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To begin creating a form in the spreadsheet module, you'll need to adjust the column widths to accommodate the information in the form. Use separate columns to hold the form's lines and borders. Using the open-apple/L command, you can adjust the columns so that they are wide enough to hold the information you'll type onto the form, such as amounts. Columns containing only borders should be one character wide.

Labels and titles can exceed the boundaries of a single column, since they appear on every form and rarely change. Simply type them across several columns if necessary.

After you enter information into the form, you can use a macro program to move that information automatically from the form to rows in a spreadsheet—where the information can be stored permanently. Just design a macro that copies the information you've entered and moves it to a particular row in the same spreadsheet (preferably a row below the form). Finally, the macro should use the open-apple/I command to insert a row just above this one. The inserted row serves to push down

Ref No.	Inv. No.	Inv. Date	Amount	Amount Paid	Amount

Bank of North Island 2112332

Your Firm Name Here
3987 First Street
City, State Zip

Check No.	Check Date	Vendor

Amount

Your Firm Name Here
3983 First Street
City State Zip

STATEMENT

Account: 2988291
Date: 12|15|87

Your Firm Name
3983 First Street
City, State Zip

Date:
Account:

DATE	CODE	REFERENCE	CHARGES	CREDITS	BALANCE	REFERENCE	CODE	AMOUNT

DUE: Total -------

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2	1034	carrying case	49.95	99.90
0	0		0.00	0.00

sub total	349.85
tax	20.99
shipping	5.00
total	375.84

please make checks payable
to: engle video center

Figure 1: You can use the AppleWorks spreadsheet module to create a variety of forms. These examples were printed with special line-graphic characters in Power Print.

To begin creating a form, you need to adjust column widths to accommodate the information in the form. Columns containing only borders should be one character wide (above).

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the information, making room for the next form's data. As you continue to fill out the form and use the macro, the rows of stored information will continue to stack up. You can use a similar technique to move information from the rows back into the form for printing.

You can print the form by simply highlighting the form block in the spreadsheet when you print with the open-apple/P command. If your printer is able to, try condensing the lines-per-inch setting with the SC (send codes) option in the Printer Options menu of the spreadsheet module (open-Apple/O). ImageWriter owners, try ESCAPE T16 to reduce line lengths.

You can print the form to disk and move it into the word-processing module for embellishment. To set up a disk printer, enter the printer-setup screen and add a new printer to the list (you might have to remove a printer if you've already specified three). Make this new printer a "custom" printer by selecting option 12 from the AppleWorks printer list. After you name the new printer, the program asks you for a slot number. Select option 7, Print onto disk or to another Apple.

Now, when you print the spreadsheet form, specify this new printer as the print location. AppleWorks will ask you for a pathname, because the information will be stored on disk in ASCII format. You can move this information into the word-processing module by creating a new document from this ASCII file on disk. Once in the word-processing module, you can easily alter the information by using the Replace command.

One of the embellishments you can add to these forms is to print them with a special print-enhancement program such as Power Print from Beagle Bros. or Print Quick from Third Wave Technologies. (See the February 1987 issue of *A+*, pages 77 and 78, for a review of Power Print.) The examples in figure 1 were printed with special line-graphic characters in Power Print. Notice that all the lines and borders connect on the forms. +

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QUESTIONS FROM OUR READERS

SELECTIVE PRINTING

Q. *When printing a word-processing file, I've had no luck using the This Page printer option. Every time I try to print a single page from a multipage file, it prints starting with the correct page but continues to the end of the file. Other AppleWorks users report the same situation. Can you help?*

Leigh D. Hagan
Richmond, VA

A. The This Page option is slightly misleading. It makes you think you'll get only the page that the cursor is on; instead, you get that page plus the rest of the document. The only way to print selected portions of a word-processing document is to use the This Page option along with the Pause Here printer option (enter open-apple/O, then PH and Escape). Place the Pause Here marker at the end of the page you want to print (you can also use the Pause Each Page [PE] option). Now place the cursor somewhere in the page, and enter open-apple/P to print. Select the This Page option and begin printing. The printout will pause at the end of the page, at which point you can cancel printing altogether, and you end up with only the page you wanted.

GRAPHING AND CHARTING

Q. *I am interested in expanding my data in the AppleWorks spreadsheet with charting features similar to those available on Macintosh products such as Excel. I have been unable to locate a charting program that can access AppleWorks data. I would appreciate any information you can provide on existing programs.*

David C. Scheller
Saudi Arabia

A. I will be covering several graphing and charting programs that work with AppleWorks in a coming issue of *A+*. If you'd like to do some research of your own, here's a lineup of products to investigate:

GraphWorks from PBI Software; Foster City, CA 94404; (415) 349-8765

App-Stat from StatSoft; Tulsa, OK 74104; (918) 583-4149

Alpha Chart from Spectral Graphics Software; Stockton, CA 95207; (209) 473-2862

Graphics Department from Sensible Software; Birmingham, MI 48011; (313) 258-5566

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BY DAVID D. THORNBURG

COMPUTERS, MATHEMATICS, AND CALIFORNIA

A curricular model from the West Coast that may sweep the country

"The teacher needs to create an atmosphere in which students understand that being temporarily perplexed is a natural state in problem solving."

"The teacher is a facilitator in the classroom."

"Students need to have a positive attitude towards risk taking if they are to have success in attacking new problems."

If you think these quotes are from a paper by some wide-eyed educational theorist, think again. They are from one of the most interesting government reports I have come across in years, "Mathematics Framework for California Public Schools" (available for $3 from Publication Sales, California State Department of Education, P.O. Box 271, Sacramento, CA 95802-0271).

This document forms the basis for the top-to-bottom rewriting of the state's mathematics curriculum for kindergarten through 12th grade over the next year or two.

I have two reasons for writing about this report in a computer magazine whose readers span the globe. First, the document contains much of special interest to all computer-using educators. Second, in order to respond to the needs of California schools (a huge market), publishers of textbooks and educational software will be racing to create materials for the curriculum. These materials will be widely available and may create a groundswell of support that will cause the program to spread across the country.

I, for one, hope that will be the case.

Central to the math framework is the idea that mathematics is a subject whose inherent beauty and fascination make it something for all learners to appreciate and enjoy. The starting premise is one that mathematicians have known for many years: Mathematics involves much more than the dry calculation of numerical results—it is a language for the expression of ideas that transcends all cultures and civilizations.

'Being temporarily perplexed is a natural state in problem solving.'

Yes, California students will be expected to know their number facts, but they will also be able to do much more—to have an attitude of curiosity and a willingness to probe, explore, experiment, conjecture, and persevere in their quest for solutions to problems of all kinds.

This approach treats mathematics holistically as a topic to be enjoyed through many means and senses and at many different levels, aesthetically as well as practically.

Computers and Calculators

Computational technology shows up on the first page of the report. Calculators and computers are considered to be sufficiently pervasive that they are an essential part of the budding mathematician's toolkit.

The use of calculators is encouraged as soon as students understand basic concepts and learn the basic operations of mathematics. The plan is to relieve the drudgery of computation so that students can come to really understand underlying mathematical ideas.

This approach does not mean that

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students will not be required to do computations by hand. In fact, pupils will be expected to develop skills of estimation with which they can, at a glance, assess the likelihood that their calculated results are accurate. The goal of calculator use is to ensure that students have time to think through their problems without spending all their energy generating numerical results.

The role that computers will play in the learning of mathematics is far richer than it has been so far. Rather than serving merely as a tool for drill and practice, the writers of this report stipulate, computer programs should help students develop higher-order thinking skills and should present simulations that help them visualize processes that are hard to express on a printed page, which is necessarily static.

Mathematics is a language for the expression of ideas that transcends all cultures and civilizations.

Those of you who have read this column for any length of time have seen several examples of the kinds of programs that fit this description well. Geometry from Brøderbund is one good example, as is King's Rule from Sunburst Communications.

These programs are only the beginning, however. The report said about the current crop of computer programs, "Although large quantities of software are available, relatively little software has been designed to be an integral part of mathematics instruction; and it must be carefully evaluated to ensure that it will support and augment the school mathematics program. Educational program designers are strongly urged to seek software that meets instructional needs and that extends and enriches the learning experience available to students."

The challenges and opportunities for software developers are exciting indeed.

The math framework divides the curriculum into seven intertwined strands: Number, Measurement, Geometry, Patterns and Functions, Statistics and Probability, Logic, and

We should teach for understanding and not teach only rules and procedures.

Algebra. Material from all seven strands is to be covered in an integrated fashion at each grade level. The computer is a natural tool to aid in the exploration of all of them.

Each strand was chosen for its intrinsic value and because it helps students become more effective at solving problems in fields other than pure mathematics.

The interweaving of material from each strand is probably more of a concern for textbook publishers than it is for software developers. It is a tremendous task that has, thus far, been tackled only by a few brave authors.

The content of the curriculum is not the only topic of interest. I think the most important and far-reaching ideas in the document are in the chapter that deals with the delivery of instruction.

The very core of the mathematics framework is that we should teach for understanding and not teach only rules and procedures for solving problems. This attitude doesn't mean that students shouldn't learn rules and procedures—they should. What it means is that they should learn and practice them in a context that makes their range of usefulness apparent to learners. Figure 1 illustrates the differences between these two viewpoints (understanding and rules).

By emphasizing teaching for understanding, the state of California is putting the old establishment on notice. "Drill and kill" software is out, and software programs that develop "higher-order thinking skills" are in.

The Challenge

Two challenges face those of us who are interested in the appropriate use of computers in the classroom. The first applies to all computer-using educators: Search through your program libraries for software you think exemplifies the goals of the new math framework. Who are the publishers of these programs? Where do the programs fit into the curriculum?

Once you've made this list (and I would love to receive your lists of software to share with the rest of you at a later date), you should identify any areas in the math curriculum that have gaping holes. What kinds of computer programs do you want to see?

In some cases you may find golden opportunities for the creation of your own software that you may be able to sell to a publisher or publish yourself. If you are not interested in creating your own programs, you should let others know what you need. Thereby, you may find your own desires becoming part of a curriculum that may soon sweep the country. ✚

David Thornburg is a regular contributor to this magazine and is the designer of Calliope, a nonlinear idea processor for the Macintosh and Apple II series of computers. You can reach him in care of this magazine.

Teaching Understanding	Teaching Rules
Emphasizes understanding	Emphasizes recall
Teaches a few generalizations	Teaches many rules
Develops conceptual schemas	Develops fixed skills
Identifies global relationships	Identifies sequential steps
Adapts well to new tasks	Used for specific tasks
Takes longer to learn (but is remembered)	Is easily learned (and forgotten)
Hard to teach	Easy to teach
Hard to test	Easy to test

Figure 1: Two ways of teaching mathematics

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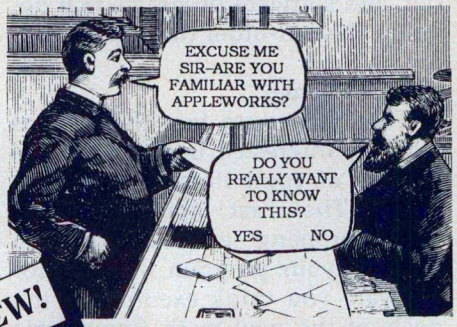

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- Spreadsheet ..... Type "3.14159"
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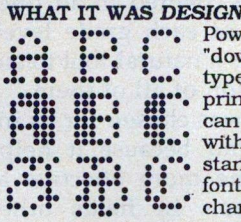

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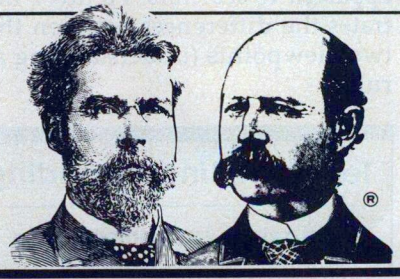

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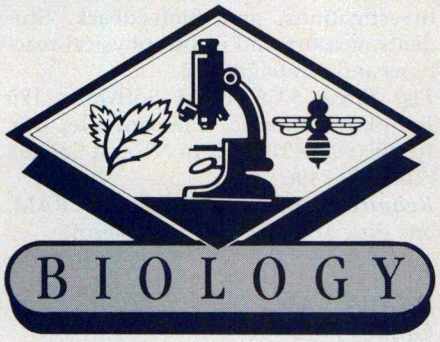

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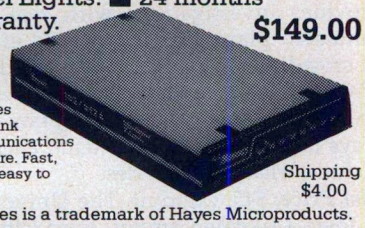

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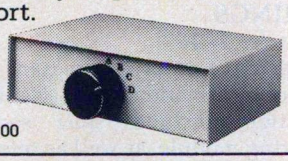

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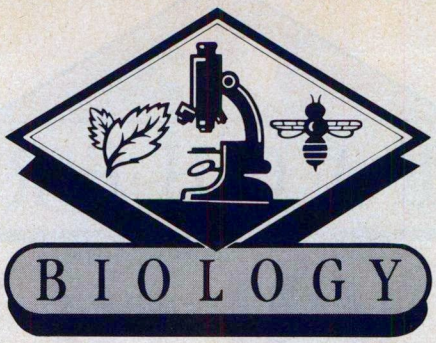

enced characteristics. Students can create a four-generation family tree. Includes testing. Not recommended for home use.
List Price: *$29.95.* Microcomputer Workshops Corporation, 225 Westchester Avenue, Port Chester, NY 10573; (914) 937-5440
Requires: Apple II Plus or IIe, 48K RAM, one disk drive, Applesoft, DOS 3.3

EXPERIMENTS IN HUMAN PHYSIOLOGY
Grades 7-16

Teaches scientific method through ten experiments such as Calibration, Respiration Rate, Heart Rate, Response Time Investigations, and Biofeedback. Students measure and record physical reactions and create graphs.
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Requires: Apple II Plus or IIe, 48K RAM, one disk drive, DOS 3.3, Applesoft

HEART LAB
Grades 7-12

Uses animated graphics to produce a simulation of a functioning human heart. Tutorial section reviews vessels and chambers of the heart while identifying their locations on a graphic model. In the drill section, students must type in correct name of vessel or chamber.
List Price: *$49.95.* Educational Activities, Inc., P.O. Box 392, Freeport, NY 11520; (800) 645-3739; in NY, AK, and HI (516) 223-4666
Requires: Apple II Plus, IIe, IIc, or IIGS; 48K RAM

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List Price: *$55.* Focus Media, Inc., 839 Stewart Avenue, P.O. Box 865, Garden City, NY 11530; (800) 645-8989; in NY (516) 794-8900
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HEREDITY DOG
Grades 7-12

Simulation program that allows students to mate dogs of different coat colors and patterns. The computer produces litters of pups, and students can study the relationships of the genotypes and phenotypes of the pups to those of the parents. Prior instruction in genetics necessary. Package includes worksheets.
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Requires: Apple II Plus, IIe, IIc, or IIGS; 48K RAM

THE HUMAN BODY: AN OVERVIEW
Grades 4-10

Uses animated graphics to present the muscular, skeletal, circulatory, digestive, respiratory, and nervous systems. Includes introduction and review testing.
List Price: *$89.* Brain Bank, Inc., 220 Fifth Avenue, New York, NY 10001; (800) 682-6565; in NY (212) 686-6565
Requires: Apple II Plus or IIe; 48K RAM; one disk drive

OSMOSIS AND DIFFUSION
Grades 9-14

A set of two programs. One introduces random motion, diffusion, and osmosis. The other allows students to change experimental variables, such as charge of molecule, temperature, and concentration of molecule inside and outside the cell. Provides testing.
List Price: *$45.* EME, P.O. Box 2805, Danbury, CT 06813; (800) 345-2050; in CT (203) 798-2050
Requires: Apple II Plus or IIe, 48K RAM, one disk drive, DOS 3.3, Applesoft

THE SKELETAL SYSTEM
Grades 4-10

Uses animated graphics to present the skeletal system. Program includes the following lessons: A Bone to Pick; Major Skeletal Bones; Joints; and Ligaments and Cartilage. Includes review testing.
List Price: *$69.* Brain Bank, Inc., 220 Fifth Avenue, New York, NY 10001; (800) 682-6565; in NY (212) 686-6565
Requires: Apple II Plus or IIe; 48K RAM; one disk drive

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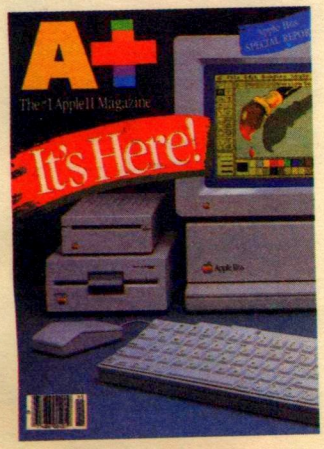

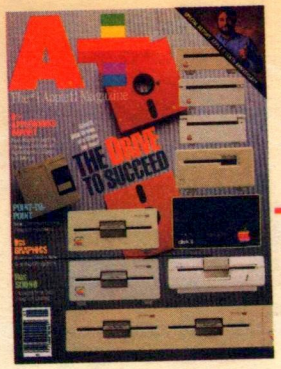

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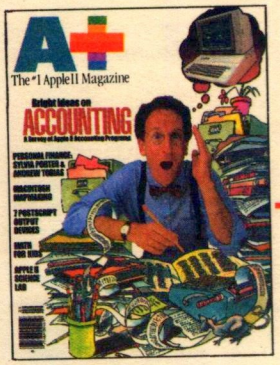

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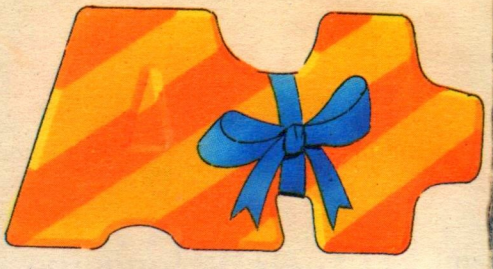

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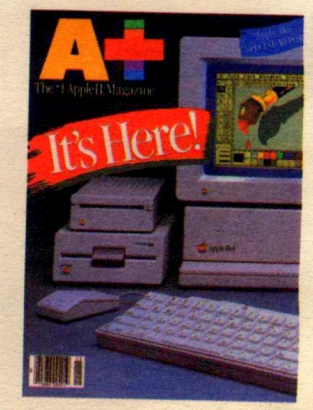

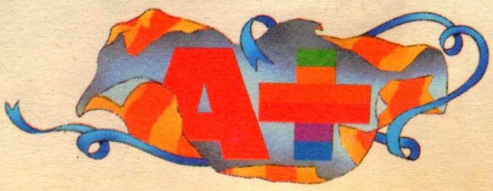

Interlude II

COWGIRL CAPER—Interlude # 125

Howdy, partner.

Howdy, partner???

You've got a date with a cowgirl tonight.

Uh oh. Have you been playing Interlude again?

Let's see...I'll need a hat, boots, chaps...and maybe spurs.

What time does the rodeo start?

As soon as you walk through the door, Cowboy!

Interlude II. The long-awaited sequel to the first adult computer game in history is finally here. It's provocative and playful! Outrageous and romantic! It has all the excitement of the original Interlude, plus significant new features.

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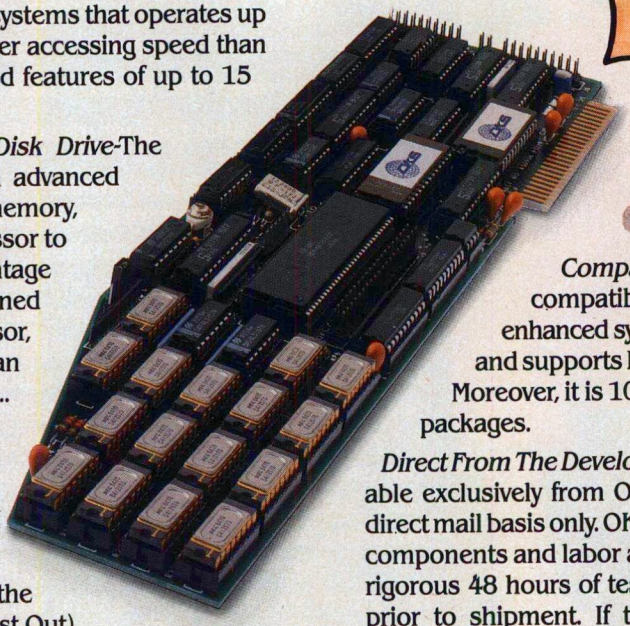

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AUTOMATICALLY anticipates data requests and transfers needed files to your Apple's CPU electronically

AUTOMATICALLY saves data in RAM disk mode for future transfer to floppy disk

AUTOMATICALLY time and date stamps files written to disk

Multi-Function Features-The Kache Plus Card also doubles as a multi-function board with a choice of up to 15 expanded features for your Apple *II* system. And, by utilizing the benefits of the Kache Plus Card's cache memory and 64180 microprocessor, each feature offers a performance advantage over comparable expansion boards on the market.

The standard Kache Plus Card comes complete with several of the most popular expansion features to date. And, with the optional features offered it can be easily upgraded to grow with the sophistication of the computer market. In addition, future innovations from OKS will be carefully engineered for easy assimilation into the standard Kache Plus Card design.

Standard Features: 256K Cache Memory/RAM Disk, On Board Clock/Calendar with Battery Back-up; Utilities for Clock/Calendar; Back-up Utilities Diskette; Concurrent Operation of 2 Floppy Drives; User Friendly/Mouse Compatible Menus; On Board Firmware Utilities for Future Upgrade.

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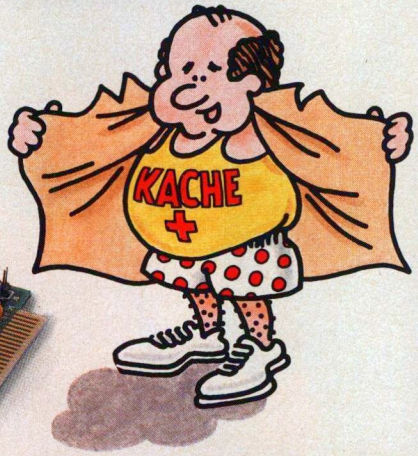

Compatibility - The Kache Plus Card is compatible with Apple *II*, *II+*, *IIe* and *IIe* enhanced systems with 1-6 floppy disk drives, and supports DOS, PASCAL, ProDOS and CP/M. Moreover, it is 100% compatible with all software packages.

Direct From The Developer-The Kache Plus Card is available exclusively from Ohio Kache Systems (OKS) on a direct mail basis only. OKS offers a full year warranty on all components and labor as well as a 30 day trial period. A rigorous 48 hours of testing is completed on each unit prior to shipment. If the Kache Plus Card does not perform as we say it will, simply return it to OKS and your money will be fully refunded.

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BY ROBERTA SCHWARTZ AND MICHAEL CALLERY

REMEMBER THE EYE OF THE BEHOLDER

Testing pre-IIGS graphics programs on the newest Apple computer

We tested some of our favorite Apple II graphics programs on the new IIGS and found that everything worked perfectly—almost. The only minor glitch we encountered was that the color and resolution of certain images looked different on the IIGS than they did on other Apple II-series computers.

Here's what can happen when you take an image created on an older Apple II with a composite monitor and try to display it on the IIGS with an RGB monitor: If you used the inherent fuzziness of the composite signal to create an image with "soft" edges, those edges become sharp on a IIGS RGB monitor. This effect is due to the RGB signal, which is crisp and sharp. Also, on a composite monitor, three pixels side by side (green violet green) produce a larger white "pixel"; on an RGB monitor, however, you see a white pixel with a green fringe.

Figure 1: Screen photo from the Apple IIGS on the AppleColor RGB Monitor

We've run into this phenomenon before, when RGB monitors were attached to older Apple IIs, but such monitors were high-cost add-ons rather than standard equipment. Besides, we could check how the image would look on a composite monitor by attaching one to the composite-video port on the back of the computer.

You may think that you can do that on the IIGS, but its composite signal is closer to that of the RGB display than it is to the older Apple II composite signal. The reason is that the Video Graphics Controller of the IIGS apparently works in RGB, converting it to composite for the composite-video port. You can easily see the difference between composite images on older Apple IIs and the IIGS when you use the hi-res dithered yellow with alternating stripes of green and orange. On the GS the colors don't blend as they do on the older Apple IIs (see figures 1–4).

Figure 2: Screen photo of enlarged portion of figure 1 from the IIGS on the AppleColor RGB Monitor

Figure 3: Screen photo of same portion of art from the Apple IIGS on a standard composite monitor

Figure 4: Screen photo of same portion of art from the Apple IIe and standard composite monitor

Graphics not created with RGB in mind may not look right on the Apple IIGS for other reasons. Certain colors produce fringes of another color; for example, the light blue generates a bright-red fringe.

The Desktop program released with early Apple IIGS com-

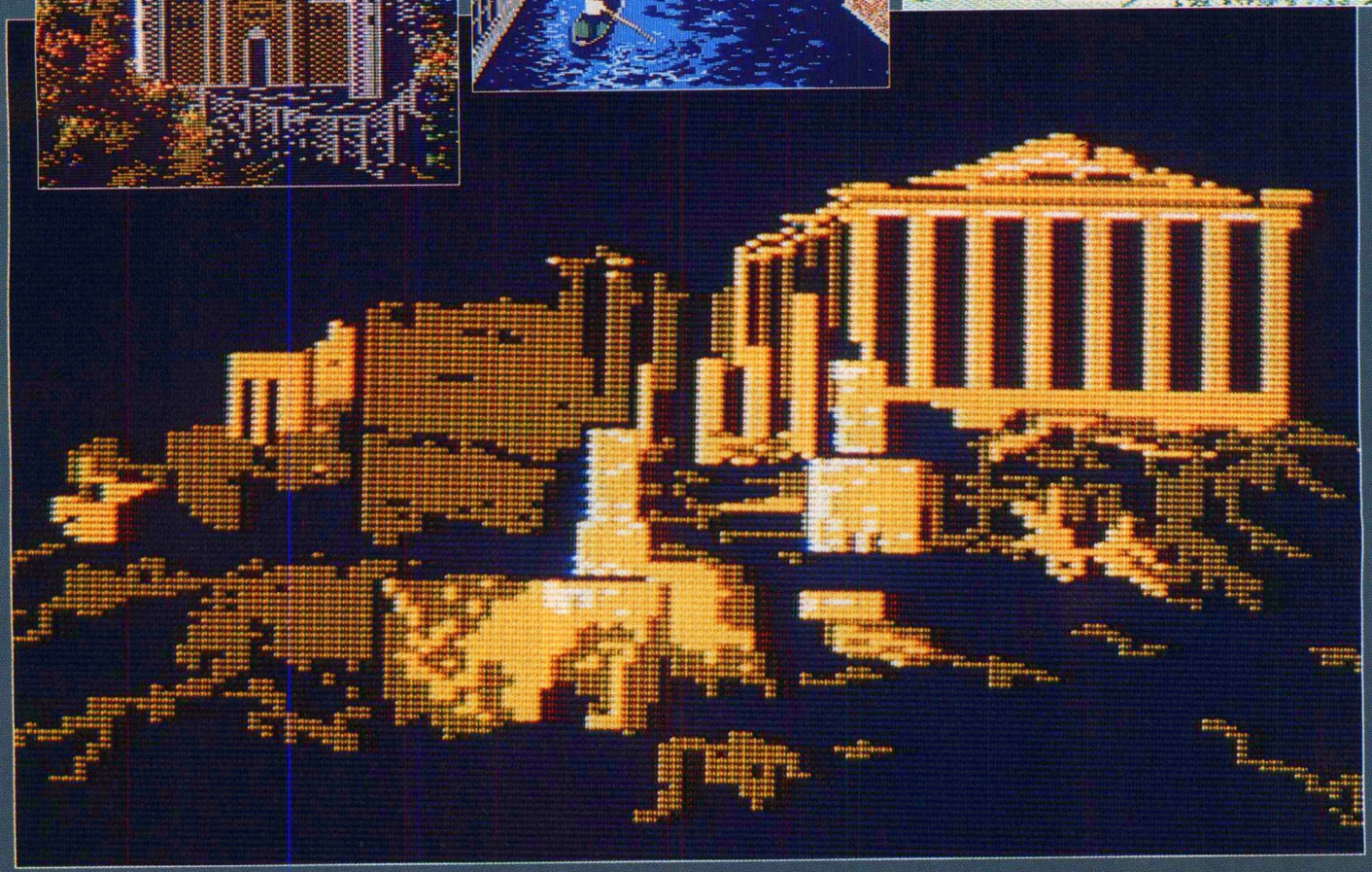
ILLUSTRATIONS ©1985 BY ROBERTA SCHWARTZ

SPEAKING OF GRAPHICS GALLERY

EUROPEAN TOUR *By Marian Gibson*

From castles on the Rhine to the moonlit Acropolis, artist Marian Gibson captures the essence of European charm using Dazzle Draw and a mouse.

A+ invites readers to submit artwork created with the Apple II to the "Speaking of Graphics Gallery." We will pay $25 for pictures selected for publication. Submissions must be on a diskette and include a written description of the hardware and software used. Send your artwork to: *A+* magazine, 11 Davis Drive, Belmont, CA 94002, Attn: Graphics Gallery. Submissions cannot be returned.



puters can work in the double-hi-res mode, but the result is a distracting, shimmering-with-color gray background that seems to indicate that something is awry in the video circuitry. But not to fear—IIGS owners will mostly use software that utilizes

Graphics not created with the RGB in mind may not look right on the Apple IIGS.

the super-hi-res graphics modes, in which the video is superb.

The message? Be aware. If you create graphics on a IIGS for other Apple owners to see on any Apple II system, be sure you look at the graphics under different system configurations. Beauty, after all, is in the eye of the beholder.

More Programmers' Utilities

We've received two more programmers' utilities, programs that add new graphics capabilities to your programs. P.A.C.K. from Interactive Arts is intended for assembly-language programmers, and Turbo Graphics from Living Legends Software adds commands via Applesoft's ampersand hook.

P.A.C.K.—The bulk of the routines in P.A.C.K. are by Bob Bishop, one of the pioneers of Apple graphics. He wrote, among other things, MicroPainter and Applevision. Applevision, distributed on the DOS 3.3 System Master, has delighted hundreds of thousands of new Apple owners. His coauthor, Lucia Grossberger, is one of the creators of perhaps the best Apple Graphics Tablet program, Designer's Toolkit.

P.A.C.K. is a combination assembly-language tutorial and graphics utility program. The package includes EDASM, Apple's 6502 editor/assembler under license from Apple, so you don't need anything else to use it. Writing assembly language to produce graphics is not easy, but P.A.C.K. does all the hard stuff for you. It provides library modules that you can insert into your own programs. Some of its routines let you plot points, play music, swap screen lines, and put text onto the screen. A second library available from Interactive Arts provides even more functions.

Nothing beats the speed of assembly language for graphics, and all serious Apple graphics programmers must, eventually, tackle assembly language. P.A.C.K. provides a relatively painless way to approach a difficult programming method.

Turbo Graphics—Turbo Graphics uses Applesoft's ampersand hook to attach assembly-language routines to your BASIC programs; you can also use these routines with your own assembly-language programs. The program is "user-supported," meaning you can give away the diskette but not the manual. Recipients who plan to use the package should send $20 to Living Legends for the full manual and support.

Turbo Graphics operates under ProDOS. Its core or kernel provides the expected basic functions, including plotting and line drawing. It also gives you turtle graphics and an enhanced shape facility with diagonal vectors and multicolored shapes. You can rotate and scale Turbo Graphics shapes with much less distortion than you can with normal Applesoft shapes. Furthermore, the kernel contains powerful commands that restrict the plotting (and drawing of shapes) to a "viewport" or window. In these days of windowed displays, such a capability is almost mandatory. Beyond the kernel, five optional modules provide for area filling, polygons, ellipses, Bezier curves, and hi-res character generation.

We like both packages but think that Apple artist/programmers will get the most use out of Turbo Graphics, thanks to its ampersand interface and impressive range of features.

Blast from the Past

When Apple abandoned its Special Delivery Software line several years ago, Apple artists lost access to the Designer's Toolkit, for use with the Apple Graphics Tablet. We recently met its author, Lucia Grossberger, at an Apple developers' conference and were pleased to learn that she still has some copies of this excellent program to sell.

In comparison to modern software, the Toolkit is a bit primitive, but several functions put it among our most used graphics software. For instance, you can draw on both hi-res "pages" (two areas in memory set aside for hi-res graphics) and then combine the two pages in a variety of ways. The program offers custom colors and brushes and provides an editor to enable you to create them. In addition, the program has a precision slide option that lets you reposition graphics to exact coordinates. In our experience, this function alone has paid for itself many times over. If you have an Apple Graphics Tablet and are using it professionally, we think you'll find many uses for Designer's Tookit.

All serious Apple graphics programmers must, eventually, tackle assembly language.

Coming Up

We have just received a terrific double-hi-res animation program called Animate from Brøderbund. We'd seen it demonstrated and were impressed, but we don't like to review prerelease software. Now that the package is released, we'll explore it fully next month. For now, let's just say that if you enjoy creating animations, you'll like it. ✚

PRODUCT INFORMATION

P.A.C.K.
Interactive Arts
2715 Porter Street
Soquel, CA 95703
(408) 475-7047
List Price: Not available
Requires: Apple II Plus, IIe, IIc, or IIGS; 48K RAM

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Designer's Toolkit
Eclectic Electric
803 Mission Street #176
Santa Cruz, CA 95060
(408) 458-3548
List Price: $250
Requires: Apple II Plus, IIe, IIc, or IIGS; 48K RAM; Apple Graphics Tablet

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Turbo Graphics
Living Legends Software
1915 Froude Street
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Requires: Apple II Plus, IIe, IIc, or IIGS; 64K RAM

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Something great should happen every time you turn on your Apple IIGS.™

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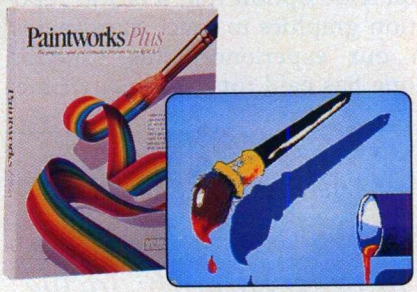

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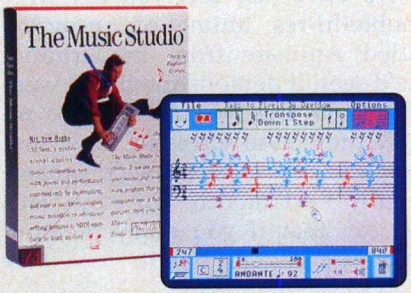

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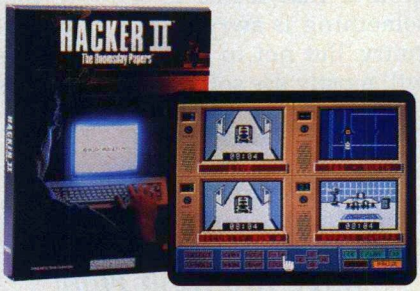

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CIRCLE 208 ON READER SERVICE CARD

GamePort

BY BOB LINDSTROM

When is a computer game not a game? When it's Portal, a science-fiction book in a personal computer.

'GamePort' this month features interviews with the authors of Portal and The Book of Adventure Games.

A NEW GENRE

The plot intrigue of author Rob Swigart's Portal hooked me quickly. By the time the program instructed me to insert disk 2, I knew that I would see this five-sided marathon through to its conclusion.

Some 20 hours later, Portal ended. I had pursued its drama with the zeal of a crazed joystick mangler, yet I hadn't immolated a single video alien. My imagination had been pushed to the limit, even though I hadn't solved one text-adventure puzzle. In fact, I hadn't called upon the skills that you usually have to exploit to play a computer game.

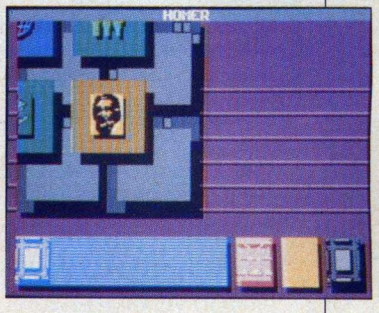
For those reasons and many others, Portal defies almost all computer-game conventions. No wonder—it's not a game. Activision accurately bills it as a "computer novel." More than that, it's one of the most unexpected, entertaining, and rewarding software products so far in 1987.

To put it simply, Portal is a science-fiction book in a personal computer. It is not, however, "interactive fiction." Interactive fiction usually means a text adventure with a little less puzzle and a bit more prose. Portal, on the other hand, truly is a computer novel, an electronic reading experience that has lots of vivid prose and a bit of interactivity. Neither game nor adventure, Portal represents an entirely new form of entertainment software.

In Portal you are an explorer who has returned to Earth in 2106 from an aborted space mission. On arrival, you discover an Earth devoid of human life. Animals and plants thrive. Cities proudly stand intact. Every human being, however, has disappeared.

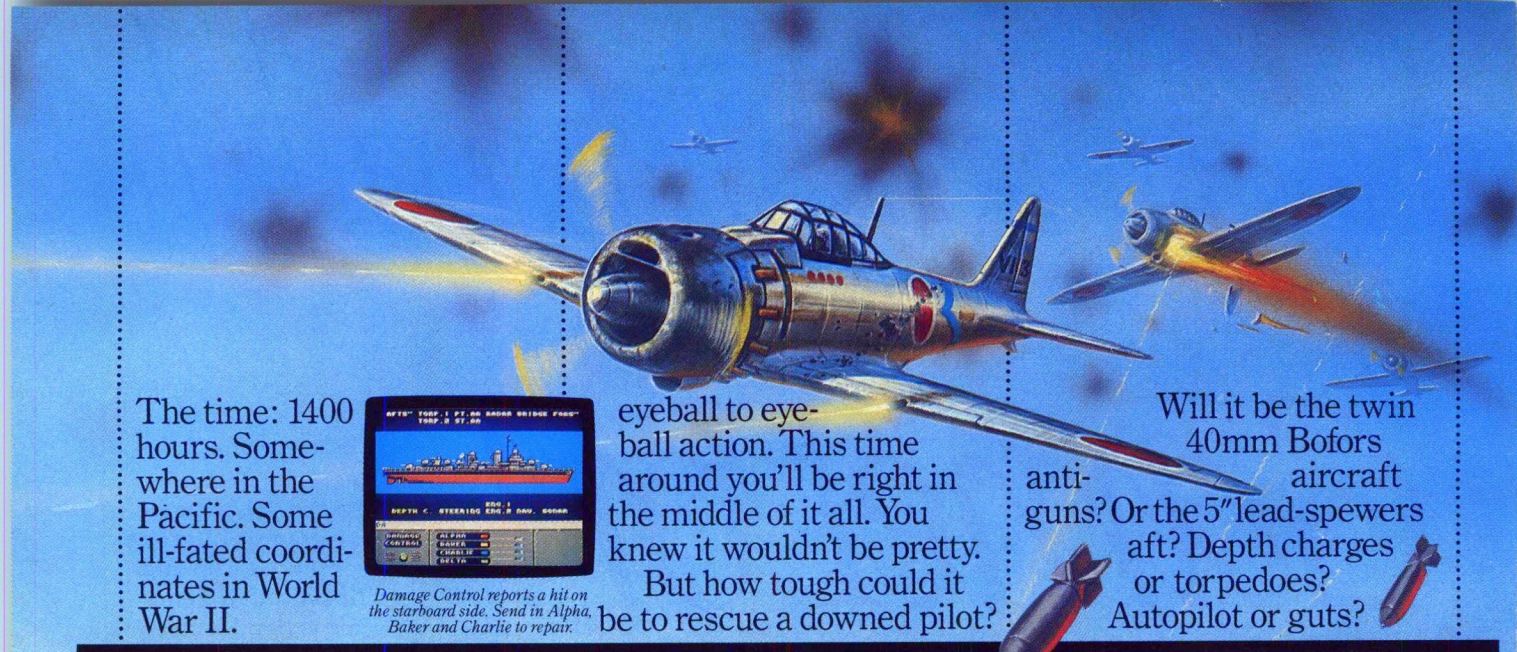
You discover a computer terminal (your Apple plays this role) connected to a vast, multinational database. Using a joystick to navigate the graphic interface of the terminal, you and an artificial-intelligence program called Homer scour the system trying to account for the mystifying absence of humanity.

To play Portal is to read it. As you make your way through the database, pieces of the story assemble like tiles in a mosaic, to use Swigart's own description. It's like reading



a novel that is selectively revealed through the medium of the database.

Without betraying too many secrets of an involved and involving plot, I can tell you that your searches put you on the track of an all-powerful international corporation and a young man who makes a subversive discovery in the psychic sciences. With a rich use of technojargon and a frightening ability to speculate on what our future might be, Swigart springs surprise after surprise, maintaining the tension and the mystery until the last screen of text. Don't be surprised if you are emotionally moved at the end. Portal



The time: 1400 hours. Somewhere in the Pacific. Some ill-fated coordinates in World War II.

Damage Control reports a hit on the starboard side. Send in Alpha, Baker and Charlie to repair.

eyeball to eyeball action. This time around you'll be right in the middle of it all. You knew it wouldn't be pretty.

But how tough could it be to rescue a downed pilot?

Will it be the twin 40mm Bofors anti-aircraft guns? Or the 5" lead-spewers aft? Depth charges or torpedoes? Autopilot or guts?

LIFE, LIBERTY AND THE HAPPINESS OF PURSUIT.

Radar spots inbound Zeroes. Ready forward gunnery positions. Man the anti-aircraft turrets. They're coming.

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It sure seemed a lot easier than shelling islands, escorting a convoy or hunting subs.

Or so you thought. But now look what you've got. Thirteen fully-operational, ear-bursting battle stations to worry about, all armed to the gills. Not to mention radar. Navigation. Sonar.

And half the Japanese fleet crawling up your spine.

Time to make some tactical decisions.

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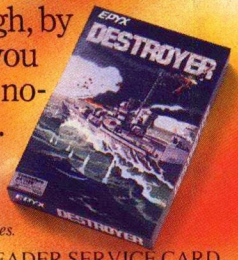
Any choice could be your last, so make it good.

Suddenly, you hear the ominous rumble of incoming Zeroes. You fire, and send one plummeting to the sea, trailing a plume of smoke.

On instinct, you instruct the bridge to commence evasive maneuvers.

Even though, by experience, you know there's nowhere to run.



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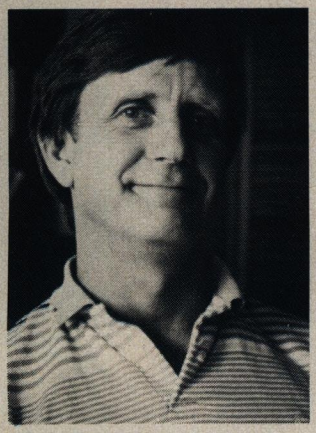
CIRCLE 144 ON READER SERVICE CARD

is touching as well as thought-provoking.

For all its innovation, Portal seems destined to leave some computer users mystified, not by the plot but by the program itself. Serious adventure-game lovers may be disappointed, even angered, by Portal's dearth of participation and lack of puzzles. Arcade-game players will find nothing to challenge their joy-



ROB SWIGART

sticks here, despite the smooth workings of the graphic database, and younger players may well be confused by Swigart's complex and refreshingly adult vocabulary.

Many others will see Portal as a cracklingly good yarn, intelligently told in a fascinating new medium.

"Computer fiction is an exciting area to be in," said Swigart in an interview. "This is the dawn. It's nice to be involved in shaping the medium." Swigart is not a typical game designer, any more than Portal is a typical game. He holds a Ph.D. in comparative literature, teaches writing at San Jose State University, and is a published novelist whose latest book is *Vector*, described as "a biotechnology thriller."

Former Activision "producer" Brad Fregger approached Swigart with the idea of writing a computer novel more than two years ago. Intrigued by the idea of putting a novel into a computer format, Swigart attempted to discover ways in which computers could enhance storytelling.

In trying to find the heart of a new art form, he examined the beginnings of other art forms. "Throughout history, the tools that man develops are initially for doing a job," Swigart explained. "But once the job is done, the tool is still there." At that point, Swigart suggested, men begin to play games with tools. "Eventually, we start changing the games and start producing art," he said.

For Portal, Swigart took that most utilitarian computer application, the database; filled it with fictional information; and came up with an artistic approach to a computer tool.

The computerized novel does have disadvantages. As producer Fregger pointed out, tongue slightly in cheek, "You can't take a computer under the covers with a flashlight."

On the other hand, Swigart's database setting allows him to make his text unusually concentrated. In one section of the database, Homer can relate a narrative loaded with unfamiliar and unexplained terms. As soon as a phrase shows up, however, an entry that defines it appears in a medical or scientific database. With this secondary support from other databases, Homer's narrative moves forward rapidly.

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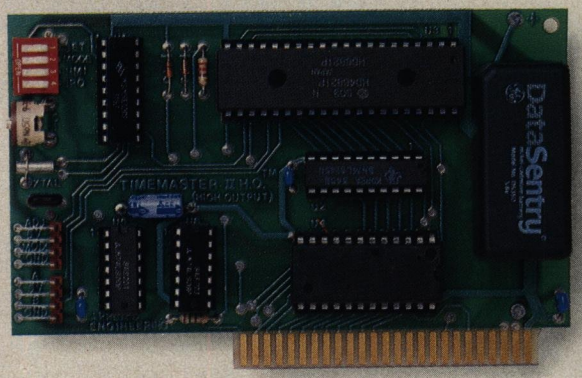

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Portal will be a controversial product likely to attract public reactions as distinctive as the software itself. But the program is just the dawn poised to light up a new horizon of entertainment software and perhaps enlighten a new audience about the joys of computer entertainment.

Activision's Portal is $39.95 for the Apple II line of computers.

IN PURSUIT OF ADVENTURE

My Apple owes its life to Kim R. Schuette, the adventurer's friend.

You know how it is. Tormented by Grues and teased by Leather Goddesses, I've let an entire evening slip away in pursuit of an adventure game. About 3 A.M. my frustration level starts to peak, and it seems the perfect time to open another session at the Lindstrom Testing Laboratory. That's the one-man, grass-roots company that researches how well Apple keyboards withstand repeated fist blows or measures an Apple computer's durability when it's forward-passed through a plate-glass window onto a driveway two stories below.

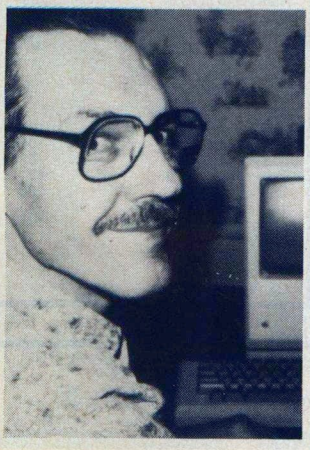
Before I make the local Apple repair shop wealthy, though, I regain control and reach for Schuette's *The Book of Adventure Games*. This two-volume set of indispensable books contains descriptions, brief reviews, and complete maps for nearly 150 popular adventure games, from Adventure to Zork, from Wizardry to Ultima. And when the going gets tough, the not-so-tough get going to the back of the books, where Schuette has tastefully tucked solutions to most of the games.

Who is this "computertarian" (the silicon equivalent of a humanitarian) who has spared thousands of innocent micros from the tantrums of their vicious owners? Is

he a programmer? Is he a computer student who plays King's Quest when he should be designing flowcharts? Or is he merely a swift man with a disk disassembler, a raider of the lost byte?

No, Schuette is only another game player like you and me. It's just that he's a particularly obsessive one. A Los Angeles aerospace engineer in his mid-50s, Schuette confesses that he plays adventure games two hours

KIM SCHUETTE



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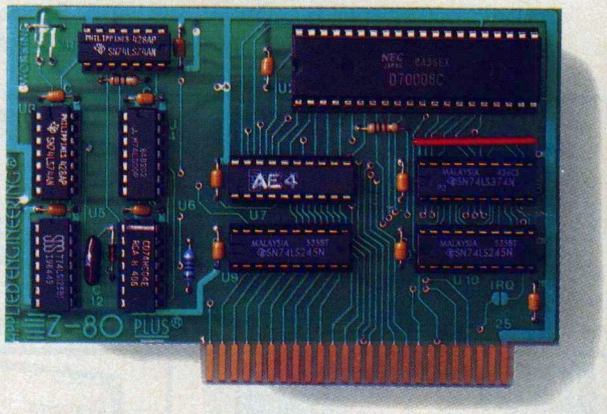

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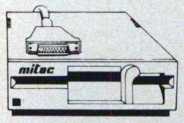

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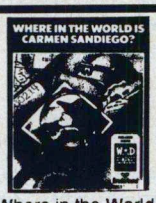

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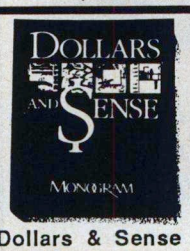

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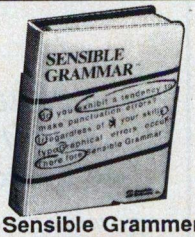

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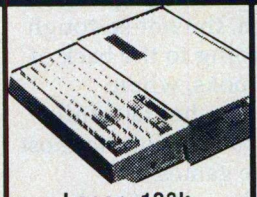

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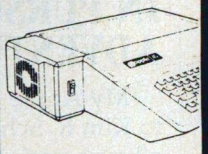

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every night and six hours a day on weekends.

The micro monkey hopped onto Kim's back in 1979 when he bought his first Apple computer and played Scott Adam's text adventure Fun House. After hours of adventuring, he discovered that the player had to close the door before setting off the bomb. The rest is history.

"I felt such great satisfaction," Schuette explained. "It just opened new vistas, so I kept playing them. I played all the Adams games as they came out, and I'm a pack rat, so I kept all the maps and notes for every game.

"Three years and 65 adventure games later, a friend and fellow adventurer who had benefited from Schuette's folders of maps and hints agreed to publish them in a book. Just to verify the accuracy of his solutions, Schuette replayed every one of the games prior to publication of *The Book of Adventure Games I*. By the time it appeared, Schuette was already well on his way to volume II.

How does this solution assembly line work? "I have an Apple II and a Macintosh," Schuette said. "Typically, I play the games on the Apple II. As I'm going along, I write the solution on the Mac."

"The way I usually start is to get in and move around as much as I can. I don't 'take' anything. I see what objects I can find and try to relate those objects to what puzzles I think there are. Then I start over and try to take some objects and not get killed."

At any given time, Schuette has three or more games in progress. He does not, however, play more than one at a time. Even adventure obsession has its limits.

But there are no limits when it comes to solving a game. I discreetly asked if he had ever used a disk-peek program to look behind the scenes of a disk in order to uncover a solution. "I'm not above doing anything I can do to break a game that I'm stuck on. I've even been known to call the vendor." Ah yes, a man who is not afraid to scream "Uncle!" and pull a fast one—Schuette clearly is a GamePort kind of guy.

Both volumes of *The Book of Adventure Games* are published by Arrays, Inc., and sell for $19.95 each. I recommend them as general-issue equipment for any adventurer, hard-core or casual. Buy a book, save a computer.

FORWARD, MARCH REVIEWS

Our March reviewers march into action with Trinity, a thought-provoking text adventure from Infocom in which you sort out the nuclear-arms dilemma. And if peacemaking doesn't work, just flatten your enemy with a well-placed chop to the chops in Epyx's World Karate Championship. Dan "Choplifter!" Gorlin soars back into action with the animated graphics of Brøderbund Software's Airheart, an eye-boggling fly-and-shoot amusement that blends technology and fantasy; and SSG gives us Battlefront, a war game you can play in two hours. ✚

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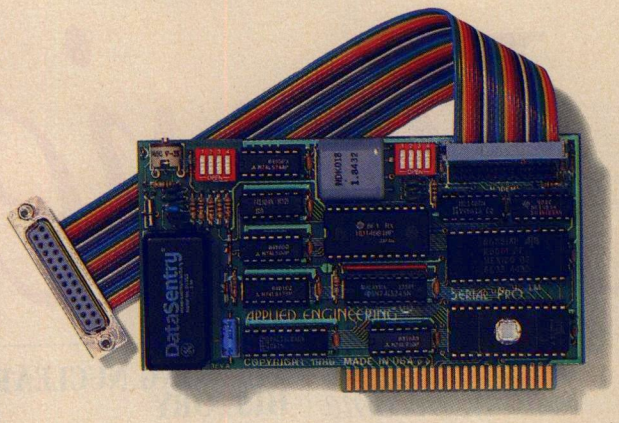

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Reviews

Alter nuclear history, become a karate champion, travel to an ocean kingdom to save an infant prince, and go wargaming with this month's games for your Apple.

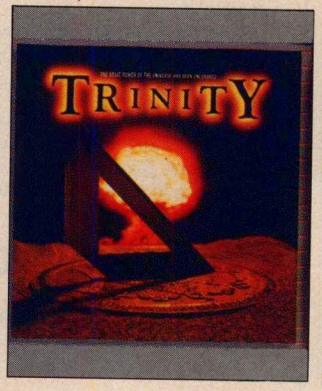
ALTERING NUCLEAR HISTORY

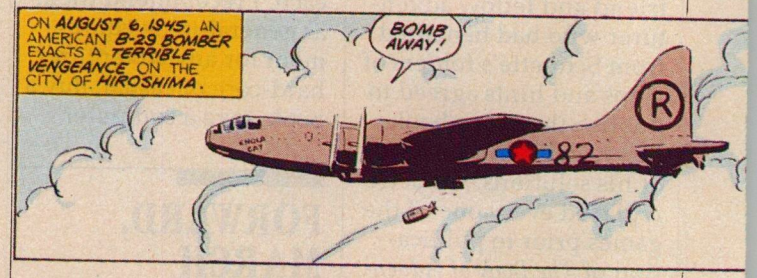
If you knew a nuclear war was going to occur in the near future (the very, very near future, to be exact) and you could travel backward or forward in time (and, perhaps into other "realities") how would you go about preventing the catastrophe?

That is the interesting problem central to Infocom's Trinity, the latest in a long line of text-only adventures from the Cambridge, Massachusetts, game maker. Trinity is easily the most sardonically witty of the lot.

You are introduced to an atmosphere of death's head humor from the moment you open the game package and encounter a comic-book manual entitled *The Illustrated History of the Atomic Bomb*. It is ironic; funny; and, as you might expect, chock full of pertinent clues. (Be especially alert to the locations of various symbols for the nine planets of the solar system.)

TRINITY
Infocom, Inc.



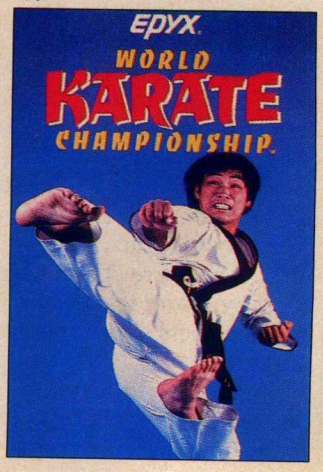


Infocom fans look forward to the treasure trove of goodies that the company packs with its games. In the case of Trinity, the stock seems a little smaller than usual. In addition to the comic book, you'll find a do-it-yourself sundial kit; instructions for folding an origami crane (you'd better believe *unfolding* a crane would be more helpful); and, most interestingly, a map dated 1945 and designated "Trinity Site Plan." Those with a knowledge of World War II history should be able to guess what that means. For those who can't guess, here's a giveaway clue: Trinity was the code name for the final test of the Manhattan Project.

So far the clues seem to place us well within comfortably recognizable realities, but rest assured that the path to changing history is tortuous and will take you through realms of wild fantasy. You may well find yourself robbing a grave to pay the boatman on the River Styx or learning to live with the peculiarities of a house carved out of a toadstool.

Peril comes in strange forms in this game. You may find that you are in more mortal danger from a bee than you are from a Soviet ICBM that you spot hovering (yes, hovering—or at least *apparently* so) over the Long Pond in

WORLD KARATE CHAMPIONSHIP
Epyx



London's Kensington Park.

A word of advice: By the time you spot the bomb, you will have done well to locate a gnomon (it will take a bit of work to discover what a "gnomon" is) and to talk to the Bird Woman. It turns out she knows quite a lot of important things.

Trinity is interesting, challenging, and entertaining. My only wish is that it could have been based much more on history than on fantasy, thus giving players a more realistic experience. It is certainly well within the expertise and ability of Infocom to deliver a similar level of challenge and entertainment without what I consider to be inappropriate elements of fantasy. As it stands, the arcane little puzzles you must solve in order to make progress in a typical Infocom text adventure seem just a bit silly and out of place here, given Trinity's subject matter.

Brian J. Murphy

TRINITY
Infocom, Inc.
125 Cambridge Park Drive
Cambridge, MA 02140
(800) 262-6868, ext. 17A
LIST PRICE: *$39.95*
REQUIRES: *Apple IIe, IIc, or IIGS; 128K RAM; one disk drive*
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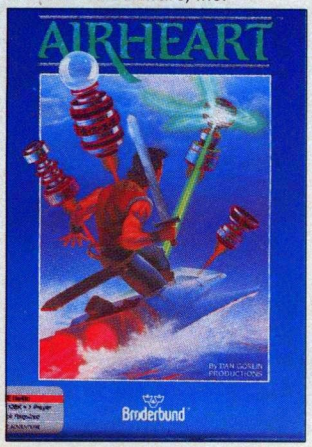
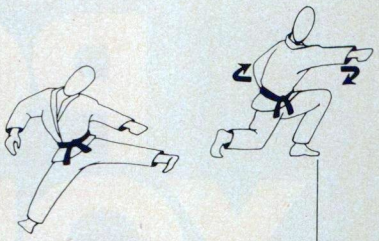
A REAL KNOCKOUT

Recent visits to the coin-op arcades have convinced me that karate games are reaping quarters by the bushel. The popularity of the two Karate Kid movies has probably generated additional interest. It seems only natural, then, that a good new karate competition on the Apple II would do well. So welcome to World Karate Championship from Epyx.

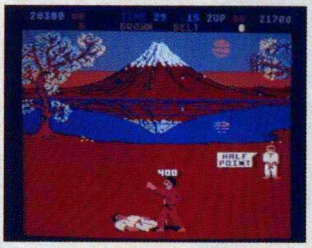
You begin by selecting a one-player or a two-player game. After that, you select your starting location—Australia or Egypt. As you progress through the championships, you move from country to country.

AIRHEART
Broderbund Software, Inc.





You start out as a white belt. In the one-player game, you fight against a computer-controlled opponent, also a white belt. White-belt opponents are usually, but not always, easy to beat. Their responses are slow, and they are easy to outwit.



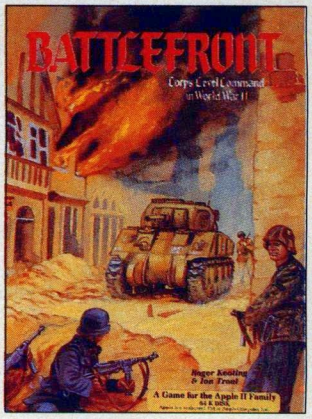
Before going on to the higher levels, you should understand the scoring for the karate championships. The two kinds of scoring are match scoring and points. Each successful blow scores as a half or a whole match point. You must win two full match points to win the match and advance, or, if time runs out, the player who is ahead wins. In the case of a tie, the Karate Master determines the winner, based on effort.

Each scoring blow also receives a point value based on its effectiveness, and that score is added to a running total. Also, the time remaining at the end of each 30-second match is added at 100 points per second. Match points determine the winner of the match. Score points determine your belt level (and that of your opponent). If you lose a match, you go back to white belt and start over.

Every so often you must undergo a test for skill. You may have to break bricks with your head or dodge deadly weapons tossed at you by unseen enemies. Good performance in the skill tests earns you extra points.

As you progress from white to yellow to green and on to black belt, the caliber of your opponent increases. By purple belt, your opponent won't make any stupid mistakes, and you will have to execute effective combinations of attacks. Where earlier you could get away with some sloppy play, from purple on up, you can't afford to sit still or turn your back on your opponent for an instant. Come in with a forward flip and follow it with a low punch to the stomach, move to a sweep and maybe a jump kick. If that doesn't work, back-

BATTLEFRONT
Electronic Arts



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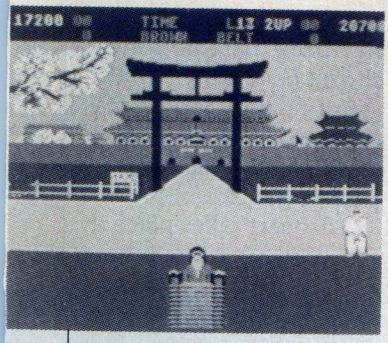

flip away from the enemy and mount a new attack.

You control your moves with the joystick. The game has 16 moves—8 with the button pressed and 8 with it not pressed. Besides the moves I've already mentioned, there are leaps; spin kicks; various other kicks and punches; and my favorite, the spinning lunge punch.

In the two-player game, at least one person must use the keyboard (the game becomes much more even if both players use the keyboard). Two-player games are best-of-three matches, 12 knockdowns per match. A two-player match runs 60 seconds. The player with the most knockdowns wins if time runs out. The winner goes on to fight the computer and begins at a belt level determined by his score at the end of the two-player match.

Playing with the joystick can become second nature. You learn to fake the opponent out with some quick blows and deliver the final coup as he stands there dazzled. The graphics are sufficiently detailed and the animation smooth enough to offer a sense of real-time

The competition in World Karate Championship is fierce, the action furious, and the challenge compelling.

response to the program (although my fighter can do things that I doubt any real human can do). On the keyboard, the situation is less rosy. I found the keyboard's response unpredictable, and I never became comfortable with it—especially the right-hand character's controls, which require you to use the Return key in place of the joystick button. Unless you are left-handed, this arrangement is awkward.

All in all, World Karate Championship is excellent, especially in the one-player mode. I came back over and over to try to make my way to black belt, failing often in my quest. The competition is fierce, the action furious, and the challenge compelling. World Karate Championship scores a knockout!

Rusel DeMaria

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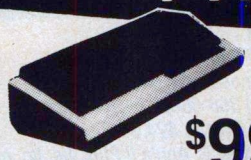
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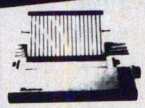
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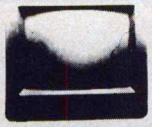
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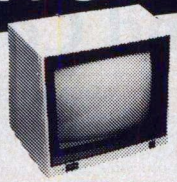
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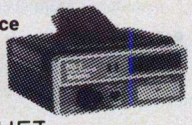
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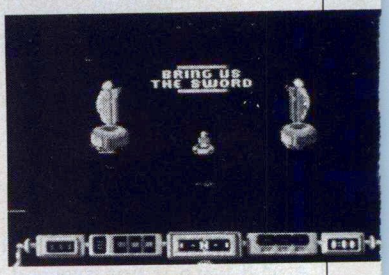
HAIL THE CONQUERING HERO

At last, a hero has surfaced—and as heroes are wont to do, he has arrived at a moment of crisis. Just as we old-Apple owners are being shaken up by the arrival of the new Apple IIGS, Brøderbund Software has released the first double-hi-res arcade game, Airheart, a creation of Dan Gorlin. That's right—Dan Gorlin, heretofore known as the author of the best-selling game Choplifter!, is our hero. How does the mere release of a game make him heroic? Read on.

A few short years ago, many Apple owners were persuaded to upgrade their II or II Plus machines to the newer IIe or IIc. Part of the lure was the 128K RAM and the double-hi-res graphics capabilities, which would bring our Apples' graphics closer to those in video arcades. The new machines were super, but we waited for the game software to justify the upgrade. Sierra On-Line did its part for the adventure side with its double-hi-res adventures King's Quest, King's Quest II, and The Black Cauldron, but where were the arcade games? I don't know about the rest of you, but I sure was getting tired of seeing the same six colors in every arcade game. (Now don't give me the old line about there being eight colors—I never could tell the difference between the two blacks and the two whites.)

So now the waiting and the hoping and the wondering are over. Dan Gorlin has finally affirmed the viability of double-hi-res arcade graphics, for the visuals in Airheart are nothing short of superb. Smooth scrolling and deft animation are the highlights of this fast-moving action-packed game.

Airheart takes place in an ocean kingdom where



an infant prince lies sleeping in suspended animation in a glass dome hidden somewhere over the water. Three Spirit Guardians are waiting for a warrior brave enough to risk battling the robot defenses that surround the princeling. Could *you* be this brave warrior? Of course you could!

The Guardians assign your test of fitness, to retrieve three items: a sword (representing strength), a goblet (generosity), and a harp (harmony). Only if you successfully complete these tasks will you be ready for the daring royal rescue. Your vehicle for traveling over (and under) the water is a jet-powered sled. Equipped with sensitive navigational devices, the sled also has a weapon for shooting the seven different robot types.

Once you've mastered piloting the highly maneuverable sled, you might find the game a trifle too easy. If I, who still after all these years can't even rack up a respectable score on Pac-Man, could finish Airheart the third time I tried, it's too easy. Which is not to say

it's bad—it's just that now that I've done it a few times in an effort to better my score, I have very little interest in replaying it. (At my *slowest*, it took me just a little more than nine minutes from start to finish.) Oh sure, I'll drag it out when I have company to let them try, but as for me, I've already gone back to my old standby, Robotron 2084.

I would love to recommend Airheart, if for no other reason than for you to see the graphics. This game is merely a harbinger of what our now outmoded Apples could've been doing all this time, had there been more heroes like Dan Gorlin to show the way. Let's pray that those of us who upgrade to the IIGS don't have to wait several years for the creation and release of arcade games with the class and integrity of Airheart.

Donald Oliver

AIRHEART
Broderbund Software, Inc.
17 Paul Drive
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(415) 479-1170
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FIGHTING THE SYSTEM

The war game Battlefront offers relentless and unmerciful conflict. Unfortunately, that conflict is mostly between the user and the program manual, for Battlefront is a very difficult game to learn.

The manual promises that the game's system of nested menus is really easy to master once you get the hang of it. Not so. Battlefront has 19 game menus, most of which are for playing one of the four corps-level World War II scenarios (Saipan, Crete, Stalingrad, and Bastogne) that come with the game. (The remainder help you create custom scenarios.)

The average user will probably require two or three trips through the manual's tutorial to master the mechanics of the game. Although the tutorial takes you step by step through the process, the explanations are inadequate. You may find yourself completing the tutorial without acquiring much understanding.

Even if you understand the process, it's dreadfully complicated

It takes 22 steps from booting up to get to the actual combat.

just to start the first move of the tutorial. In the Saipan scenario, you start with menu A; then go to menus B, C, E, F, and G; then back to E; and then to menu H. At this point, the manual proclaims, "We're just about ready to play." But wait! Before you can start, you must go to menu 1, then menus 4 and 5, then back to 4, and then to 1 again. Your next stop is menu 14; then menus 15, 17, 15 (again), 9, 17 (again), 10, and 13; and finally back to menu H again.

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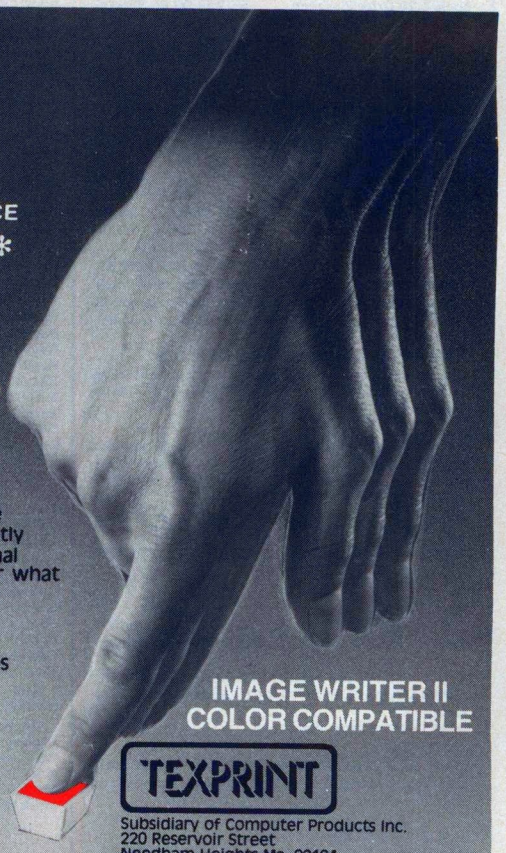

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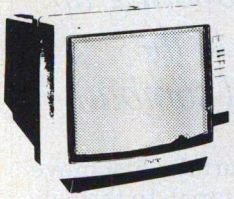

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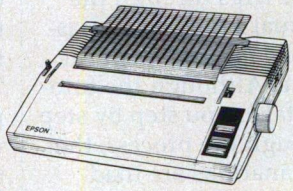

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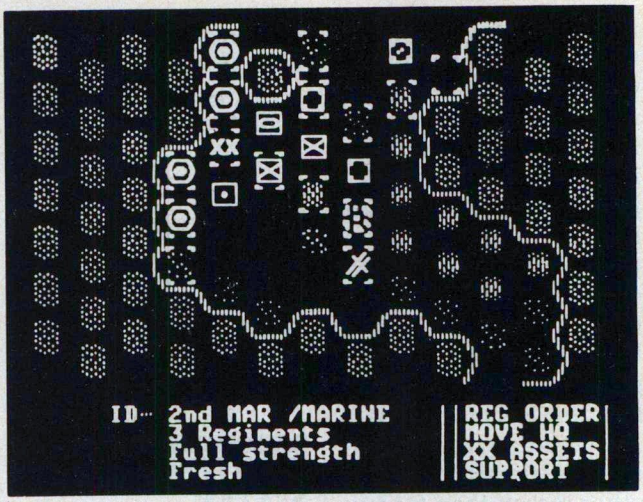

At this point, having prepared your units, set the objectives, allocated fire support, and in every other way made your guys ready for battle, you turn the fighting over to the computer. All it takes is a mere 22 steps from booting up to get to the actual combat of this war game.

The program's coauthors, Roger Keating and Ian Trout, have released other recent games (Carriers at War, Europe Ablaze) that are fascinating but decidedly difficult to learn.

Recommending Battlefront is difficult when so many other games require fewer mental contortions and offer comparably detailed simulations.

My other reservation concerns tactical control. This game seems to restrict players to making strategic decisions, leaving the actual tactics of battle in the "hands" of the computer.

In the Saipan scenario, for instance, player control of the battle is limited to selecting objectives and controlling the intensity of the attack and support fires. Once you give the troops their marching orders, they more or less go it alone. For all the complexity of the game system, the feeling of real control in Battlefront is surprisingly lacking.

Battlefront's best feature is a design function that allows you to create a scenario from scratch or to vary one of the supplied scenarios. Designing your own is the most fun (again, if you can master the menus). You build a map with all the terrain features you want, and then you create highly detailed forces to fight your battle.

If you can spare the time to puzzle out the mechanics of Battlefront, then the game's wealth of detail and its scenario-design features should prove entertaining. If you're short on patience for puzzling, however, many of the same wargaming kicks (if not Battlefront's design pleasures) are available elsewhere.

Brian J. Murphy

BATTLEFRONT
Electronic Arts
1820 Gateway Drive
San Mateo, CA 94404
(800) 245-4525
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BY MICHAEL WIESENBERG

MULTIPLE MULTIPLICATION MYSTERY

Test your digit-scrambling expertise

Some puzzles seem like they need a computer to solve them but don't. For example, what number, n, has in the digits of its cube (n^3) and fourth power (n^4) all the digits 0 through 9, once each?

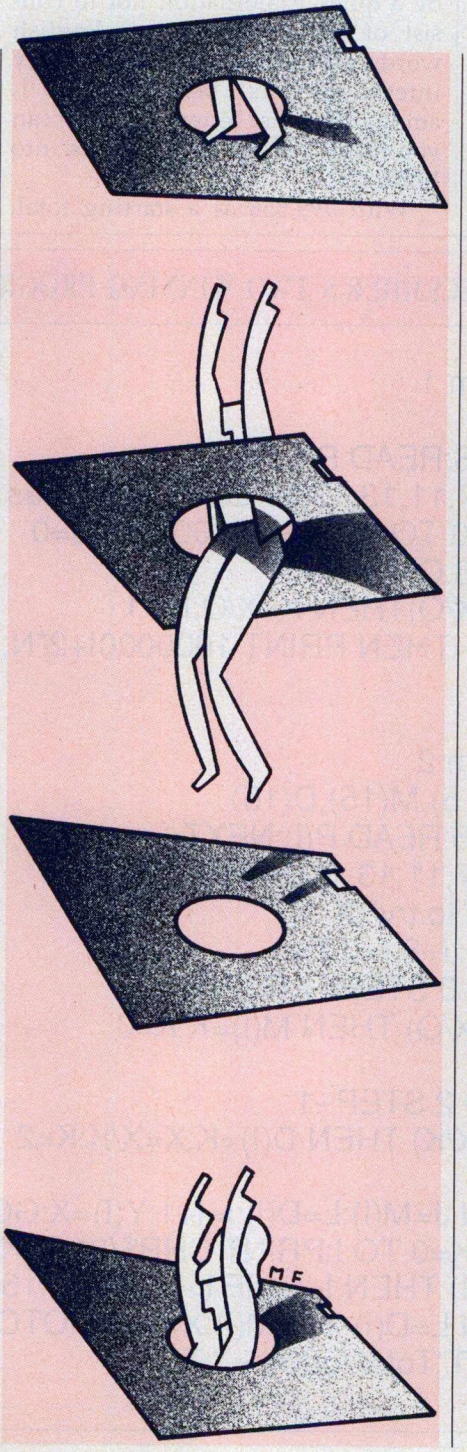
For a puzzle best solved with a computer, find a six-digit number that, when multiplied by 2, 3, 4, 5, and 6, each time produces a new number composed of the same digits as the original (but in different orders). The answer is not 000000! (That's not a six-digit number.)

Send a complete program that solves the second puzzle (and answer the first, if you can, showing how you did it without a computer). If you send a disk, also enclose hard copy, including output and running time. Your program must be short, elegant, and self-documenting. The best solution wins a one-year subscription to *A+* and a Certificate of Excellence in Programming and will be published here.

Please send all entries, which must be received by March 12, 1987, to Computer Calisthenics, Box 2329, Stanford, CA 94305. All entries become the property of the author. The winner will be selected by the author, whose decision will be final. The winning program will be announced in the May 1987 *A+*.

Answer to December's Puzzle

December's puzzle requested a program that found the word either equal or closest to 1,000,000, based on assigning a numerical value to each letter of the alphabet, starting with 1 for *Z*, 2 for *Y*, and working backward to 26 for *A*, and then multiplying the values of each of its letters. I guess this was a harder puzzle than I had anticipated, because I got fewer entries for this one than for any other so far.



Seth Padowitz, of San Diego, stated that since "the prime factors of 1,000,000 are $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 5 \times 5 \times 5 \times 5 \times 5 \times 5$, or $2^6 \times 5^6$, the letters in any word multiplying to 1,000,000 would have to have only 2s and 5s as factors; the only values between 1 and 26 that fit are 2, 4, 5, 8, 10, 16, 20, and 25, which correspond to the letters *Y, W, V, S, Q, K, G,* and *B*. There are no vowels among those letters. Since a minimum of five letters are required ($25^4 = 390{,}625$, which is less than 1,000,000), and there are no words in the English language with no vowels, no such word can exist."

Some problems with that reasoning: One is that it didn't account for the letter *Z* (value 1). The other is that *Y* is sometimes a vowel. Maybe some word with five or more letters containing only *Y*s multiplies to exactly 1,000,000. After all, words such as *hymn* and *rhythm* contain no vowels other than *Y*, and the word *nth* actually has no vowels at all!

Robert Stong, who teaches mathematics at the University of Virginia, Charlottesville, sent two programs that nicely solve the puzzle. He wins December's contest.

The first generates all numbers that are within 1600, plus or minus, of 1,000,000, with prime factors less than or equal to 26. Any number greater than 26 would not represent a letter of the alphabet. The program produces these possible totals within the specified range: 998400, 998784, 998816, 999362, 999600, 999702, 999810, 999856, 1000000, 1000188, 1000350, 1000692, 1000960, and 1001000.

ILLUSTRATION BY MARK FISHER

The second has you specify one of the numbers the preceding program has produced. It then generates all the letter combinations that multiply out to exactly that total, with these "words" in alphabetical order, and the letters of each in only one combination, that also alphabetical. It is then up to the human who interacts with the program to discover which might form a real English word.

This you do by mentally rearranging those letters. The program makes no attempt to present all letter orders for each word, because then the output would be too much to read. Each word of six different letters, for example, would have 720 different combinations.

Stong also programmatically worked out how many distinct permutations (that is, with letters in all possible orders, but if a letter is repeated, the same order not counted more than once) each word multiplication would have and came up with 124 alphabetized words multiplying out to exactly 1,000,000 and producing 137,688 distinct permutations; 13 and 9240 for 999,856; and 102 and 189,832 for 1,000,188.

The second program, when given 1,000,000 as the total for which to generate combinations, produced 124 "words" with no vowels other than *Y*, and lots of *B*s, *G*s, *K*s, *S*s, *V*s, *W*s, and *Q*s, all of which can be seen by a quick examination not to consist of the letters of any English words. Of course, you can randomly intermingle *Z*s, being worth 1, among the other letters. But how can you make a word by fitting *Z*s into BBBKYY?

With 999,856 as a starting total, Stong's program produced this list: ADEHW, ADEHYY, ADHPS, ADHPWY, ADHPYYY, DEHNS, DEHNWY, DEHNYYY, DHKNP, DHNPSY, DHNPWW, DHNPWYY, and DHNPYYYY. Stong did not suggest what words might be made from these, so I give honorable mention to Paul and Kerry Berland, of Chicago, whose program generated many, but not all possible candidates, and who, on finding the 999,856 value combination DHAEW, realized those letters could be rearranged to form the word *hawed* (as in "hemmed and hawed").

Donald Hodson, of Lake Ronkonkoma, New York, also gets a mention, for his C program that randomly generated combinations of four consonants and two vowels and came up with another word for the 999,856 product, *heyday*. ✚

DECEMBER'S TWO WINNING PROGRAMS

```
10   REM Program 1
20   DIM P(8)
30   FOR I=0 TO 8:READ P(I):NEXT
40   DATA 2,3,5,7,11,13,17,19,23:REM Primes less than 26
50   FOR N = -800 TO 800:X=500000!+N:J=0
60   FOR I=0 TO 8:Q=P(I)
70   IF X=Q*INT(X/Q)THEN X=X/Q:I=I-1
80   NEXT:IF X=1 THEN PRINT 1000000!+2*N;" ";
90   NEXT
```

```
10   REM Program 2
20   DIM P(8),Y(15),M(15),D(15)
30   FOR I=0 TO 8:READ P(I):NEXT
40   DATA 2,3,5,7,11,13,17,19,23
50   INPUT "Total to try";X
60   Y(0)=X:L=26:J=8:I=0:T=0
70   FOR K=J TO 0 STEP -1:Q=P(K)
80   IF X=Q*INT(X/Q) THEN M(I)=K:K=0
90   NEXT
100  FOR K=L TO 2 STEP -1
110  IF X=K*INT(X/K) THEN D(I)=K:X=X/K:K=2
120  NEXT
130  IF X>1 THEN J=M(I):L=D(I):I=I+1:Y(I)=X:GOTO 70
140  T=T+1:FOR K=0 TO I:PRINT CHR$(91-D(K));:NEXT:PRINT" * ";
150  F P(M(I))=D(I) THEN I=I-1:IF I>-1 THEN 150
160  IF I>-1 THEN L=D(I)-1:J=M(I):X=Y(I):GOTO 100
170  PRINT:PRINT"Total found = ";T
```

TIPS AND TECHNIQUES

Readers share tips for the II

Many readers sent in their wonderful tips and techniques; in fact, we got so many good ones that we cannot print them all at once. Each month, however, we will print as many tips as possible. If we print yours, we will pay you $25 and include your name. Send your original tips along with your name, address, and social security number to

A+ magazine
Attn: Tips and Techniques
11 Davis Drive
Belmont, CA 94002

Those tips not credited with individuals' names are adapted from Bert Kersey and Bill Sanders' *The Big Tip Book for the Apple II Series* (Bantam Books, 1986).

SINGLE-KEY COMMAND

Type this:

```
POKE 1013,76
POKE 1014,110
POKE 1015,165
```

Now the command &-Return will CATALOG! Change the numbers after the commas to 76, 165, and 214, and & will LIST; 766, 18, and 217 will make & RUN; 76, 112, and 214 will make & clear all variables to zero. When you type &, your Apple jumps to location 1013 ($3F5) to see what's happening there. The POKEs discussed here tell the Apple what to do.

ONE-LINER: CARTWHEEL

```
1   HGR2 : HCOLOR= 3: FOR A = 768 TO 779: READ B:
    POKE A,B: NEXT : HPLOT 0,142 TO 279,142: DATA
    1,0,4,0,3,3,5,1,1,1,7,0 : POKE 232,0: POKE
    233,3: SCALE= 23: FOR N = 1 TO 9999: FOR T = 0
    TO 63: ROT= T:G = G + 4.359375: DRAW 1 AT G,95:
    XDRAW 1 AT G,95: NEXT :G = 0: NEXT
```

Wes and Wayne Weber
Canon City, CO

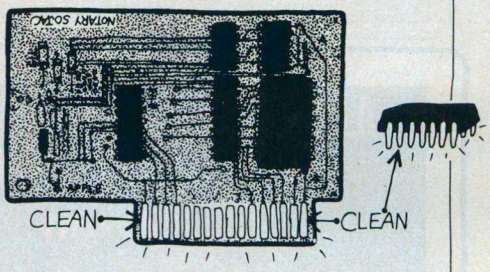
THREE-LINER: GET THE TELEPHONE

```
10  FOR I = 0 TO 13: READ RING: DATA
    160,35,169,19,32,168,252,173,48,192,136,208,245,
    96
15  POKE 16384 + I,RING: NEXT I
20  FOR A = 1 TO 30: CALL 16384: NEXT A: FOR B = 1
    TO 2850: NEXT B: GOTO 20
```

Daniel Park
Buena Park, CA

CLEAN YOUR HEAD!

If you buy the disk-drive, head-cleaning kit that *A+* has, you'll notice that the manufacturer forgot to tell you where the head is (top or bottom) on your Apple. It's on the *bottom*. Don't get cleaning fluid on your pressure pad; it's on the *top*.



By the way, if you're not sure how to get the head spinning, try the following:

```
POKE -16151,0
```

To stop the spinning:

```
POKE -16152,0
```

APPLE PIE

```
10 REM A. T. N.
20 REM
30 REM ( APPLES TIMES NUTS )
40 REM
50 AP = 1:NU = 4
60 II = ATN (APPLES) * (NUTS)
70 PRINT "APPLE "II" YUM!
   YUM!"
```

Leonard Schrock
Tangent, OR

NO CAT

POKE–21503,0 prevents a DOS 3.3 catalog (17 is the normal value at this address).

TWO-LINER: A+

```
1   A$ = "LEMFHHEKSIRFCELILHEISJHIAIEGK
    FSETKNGEHHJOHAKRKSFLFBFCILGAHDFKHMHAJNEGIDINFSKA
    GNIEJSGOFBINHSHII": DATA 1,0,4,0,46,60,0: HGR2 :
    POKE 232,0: POKE 233,3: SCALE= 11: ROT= 0: FOR I
    = 0 TO 6: READ D: POKE 768 + I,D: NEXT :A = 13:Z
    = 46: DIM G(Z),H(Z)
3   FOR T = 0 TO Z:X =  INT ( RND (1) * 21) * A:Y =
    INT ( RND (1) * A) * A: XDRAW 1 AT X,Y:G(T) =
    X:H(T) = Y: NEXT : FOR T = 0 TO Z * 2 STEP 2:
    XDRAW 1 AT G(T / 2),H(T / 2): XDRAW 1 AT ( ASC (
    MID$ (A$,T + 1,1)) - 64) * A,( ASC ( MID$ (A$,T
    + 2,1)) - 64) * A: NEXT
```

Wes and Wayne Weber
Canon City, CO

THREE-LINER: SNAIL RACE

```
30  PRINT  CHR$ (21): TEXT : HOME : FLASH : POKE
    49167,0: DIM M(24):MAX = 1
50  R =  INT ( RND (1) * 20) + 1:M(R) = M(R) + 1:
    VTAB R: HTAB M(R): FLASH : PRINT "!";: IF M(R) >
    = MAX THEN MAX = M(R): NORMAL : FOR V = 1 TO 20:
    VTAB V: HTAB 39: PRINT V;: NEXT : INVERSE : VTAB
    R: HTAB 39: PRINT R
60  ON M(R) < 36 GOTO 50: NORMAL : VTAB 22: PRINT
    CHR$ (7);"#";R;" WINS!": END
```

Mark E. Irwin
Lorain, Ohio

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CIRCLE 302 ON READER SERVICE CARD

CHECK DISK DRIVE

The Apple IIc main drive runs only for a few seconds if you try to boot with the door open or with no disk in the drive (it could happen because of a power failure). On other Apples it's a good idea to keep a disk installed when you're away. Otherwise, you may come home to a very hot disk drive.

FLOSS YOUR DOS ON YOUR APPLE II PLUS AND IIe!

Certain unexplainable memory losses and other errors can be caused by an accumulation of gunk (technically, "crud") on the little feet of your ROM chips and the metal "teeth" of your various cards. You can clean these metal surfaces with a nonabrasive pencil eraser and/or a cotton swab and denatured alcohol. But be careful! First, turn off your computer (leave it plugged in). Ground yourself by touching the metal power-supply box inside your Apple. Pull the chips with a chip puller (ask your dealer for one; tell him you just want to borrow it to show your spouse). Or use a small screwdriver and pry the chips loose. Carefully and *gently* clean things one at a time so you don't get them mixed up. Get rid of all eraser dust, fingerprints, and hair. Carefully insert everything just the way you found it. If you have an unopenable IIc, *none of the preceding works.*

INCREASE YOUR TYPING SPEED ON THE IIc

You probably didn't realize this, but the QWERTY keyboard was designed to slow typists down. The old machines (I think they called them typewriters) just couldn't keep up with Miss Nerty's speed typists. This embarrassed the typewriters and clogged their keys; so they made the QWERTY keyboards to tangle up fingers.

With word processors came type-ahead buffers that could keep up with Attila the Typist, so they decided to put in the Dvorak keyboard, which allows you to type 40% (some claim) faster. On the Apple IIc, you can have either the QWERTY or the Dvorak by punching a little toggle switch on top of the computer with a pen. All you have to do is remember which keyboard you have going, since the keys are still marked in QWERTY. If you switch back and forth, you may get *lock finger.* +

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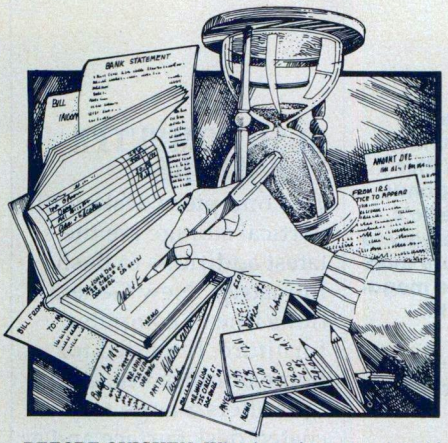
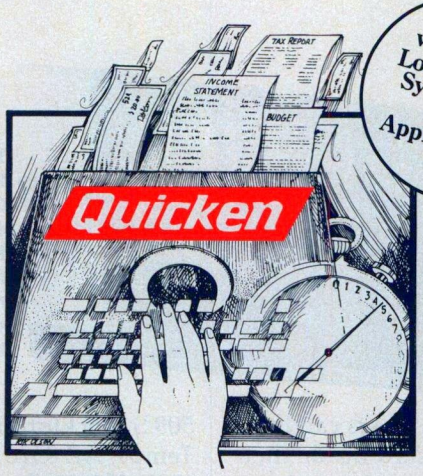


BEFORE QUICKEN: Who doesn't want to get rid of the hassles of paying bills, managing finances, and keeping records?



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—Ken Landis, A+ Magazine

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Recordkeeping? That's done for you. With each bill, Quicken filled out your records, updated all balances, and saved it all on disk. Need to record a check you wrote at the store? No problem, Quicken's macros update your records in an instant.

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IBM® PC, XT, AT, PCjr., and compatibles with 192K RAM and one or two floppy disk drives or hard disk. Any printer. No modem required. 1-2-3 and Symphony optional.

Apple® IIgs, IIc and IIe (IIe requires extended 80-column card), with one or two floppy disk drives, or UniDisk™ 3.5. Any printer. No modem required. AppleWorks optional.

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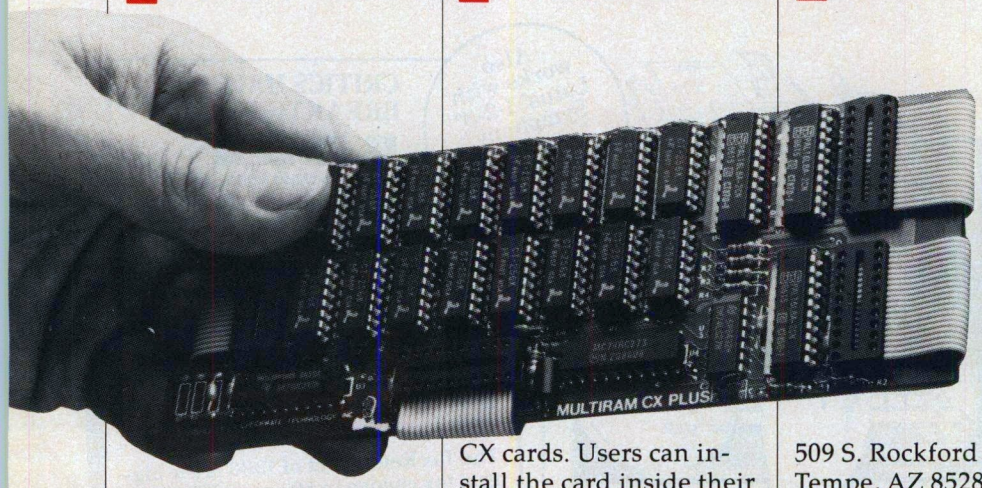


The MultiRam CX Plus expands the IIc's memory to more than one megabyte.

MULTIRAM CX PLUS

The newest addition to Checkmate Technology's MultiRam memory-card series, MultiRam CX Plus can expand the Apple IIc's memory to more than 1 megabyte. A piggyback card, the MultiRam CX Plus connects to the MultiRam CX, another Checkmate memory card for the IIc; it is also compatible with all CX cards. Users can install the card inside their computer without altering any components. It is available in a 512K memory configuration, uses CMOS circuitry to reduce power consumption and heat buildup, and allows for use of a battery pack with the IIc. *(List Price: $244.95)*

Requires: Apple IIc, MultiRam CX

Checkmate Technology, Inc.
509 S. Rockford Drive
Tempe, AZ 85281
(800) 325-7347
(602) 966-5802

CIRCLE READER SERVICE NO. **500**

The ThinWrite 100 AP battery-powered printer

THINWRITE 100 PRINTER

Axonix Corporation has introduced an Apple-compatible version of its ThinWrite 100 battery-powered printer. The ThinWrite 100 AP weighs six pounds and can provide 75–100 pages of print per battery charge. It prints draft-quality print at 70 cps and near-letter-quality print at 25 cps. In addition, the printer can print on any paper stock, can handle multicopy form printing, has a 4K print buffer and a 256-character download buffer, and features hardware diagnostics. It comes with batteries, tractor feed, and an AC charger/adapter. An AC-only version of the printer is also available. *(List Price: $529; AC-only version, $429)*

Requires: Apple II Plus, IIe, IIc, or IIGS

Axonix Corporation
417 Wakara Way
Salt Lake City, UT 84108
(801) 582-9271

CIRCLE READER SERVICE NO. **501**

BUSH COMPUTER FURNITURE

Two one-piece desks with vertical storage are the latest additions to Bush Industries' New Generations line of computer furniture. Intended for home or office use, each unit offers a large acrylic-coated desk surface and a multiuse hutch. The desks also feature rounded edges, softly shaped tops, a library oak finish, fully finished backs, modesty panels, and adjustable leveling guides.

Model CT150 measures about 54 × 39 × 23 inches and offers two open desk shelves and two adjustable storage shelves in the hutch for

Bush Industries' Model CT152 computer desk

L I N E

peripherals and accessories. The hutch also has an adjustable monitor shelf and a full-width bookshelf. Similar in design to the CT150, Model CT152 measures 55½ × 47 × 26 inches. It also has a box drawer on the right-hand side of the desk and an adjustable monitor shelf, and the hutch's storage shelves are concealed behind doors. *(List Price: CT150, $149.95; CT152, $189.95)*
Bush Industries, Inc.
One Mason Drive
P.O. Box 460
Jamestown, NY 14702-0460
(800) 228-BUSH
In NY (800) 248-BUSH
CIRCLE READER SERVICE NO. **502**

A sample screen from Polarware's Electric Crayon series

ELECTRIC CRAYON COLORING BOOKS

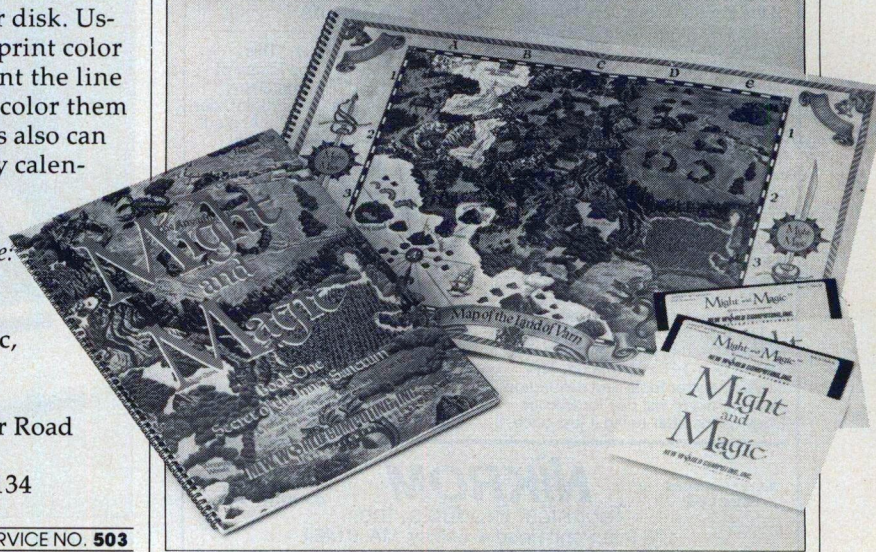
Polarware has introduced three titles—ABCs, Fun on the Farm, and This Land Is Your Land—in its new Electric Crayon series of computer coloring books for children ages 3–13. The programs produce on-screen color line drawings with more than 25 pictures per disk. Users can either print color pictures or print the line drawings and color them by hand. Users also can create monthly calendars and can add color pictures. *(List Price: $14.95 each)*
Requires:
Apple IIe or IIc, 128K RAM
Polarware
2600 Keslinger Road
P.O. Box 311
Geneva, IL 60134
(312) 232-1984
CIRCLE READER SERVICE NO. **503**

MIGHT AND MAGIC

The first in a series of fantasy/role-playing games from New World Computing, Might and Magic—Book One: Secret of the Inner Sanctum lets players assemble a party of six adventurers to explore a complete world. Players cross oceans, climb mountains, and search through castles and dungeons—all displayed in 3-D color graphics.

Detailed options throughout the game include an elaborate combat system and hundreds of special events and encounters during which players use 94 different spells and more than 250 items of magic to deal with more than 200 monsters. The Might and Magic game comes with a 54-page illustrated reference manual, a color fold-out map of The Land of Varn, and a quick-reference spelling chart. *(List Price: $54.95)*
Requires: Apple II Plus, IIe, IIc, or IIGS; 64K RAM

Book One: Secret of the Inner Sanctum, the first game in the Might and Magic series of fantasy/role-playing games, is now available.



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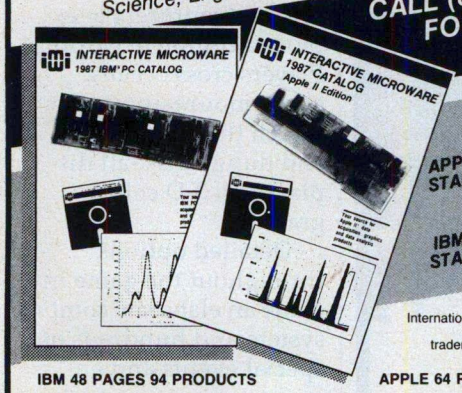

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CIRCLE 323 ON READER SERVICE CARD FOR APPLE
CIRCLE 324 ON READER SERVICE CARD FOR IBM

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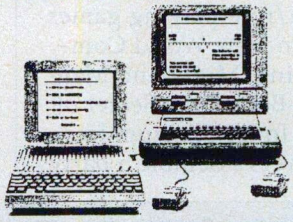

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Master Diagnostics provides all of the tools and knowhow necessary so that *anyone* can do monthly maintenance duties. Calibrating disk drive speed, cleaning drive heads, checking track alignment or just adjusting your monitor to peak clarity is a snap.

In addition to the maintenance routines, extensive diagnostic procedures are available at the touch of a key. With our **new diagnostic construction set**; you can create peripheral diagnostics for any device card. Problems are diagnosed down to the chip level and tests will report: *what's right, what's wrong, what to do and how to do it.* Not just pass-fail type exams!

The user manual is easy to understand and is packed with money saving U-DO-IT information. The Drive Analyzer tests and calibration routines alone will pay for Master Diagnostics after using it just once.

Expert Opinions

Nibble magazine says, "This program should be in the library of every Apple user". Howard Sams Tech Manual, Apple Orchard, InCider Popular Computing, and the Apple II Review have all awarded Master Diagnostics with triple AAA ratings. *Consumers Guide chose Master Diagnostics as one of the best programs for 1985.* Used by Apple service centers world-wide.

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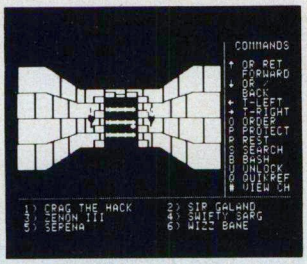


Might and Magic

New World Computing, Inc.
P.O. Box 491415
Los Angeles, CA 90049
(800) 443-1888
In CA (800) 445-1888
(213) 659-1888
CIRCLE READER SERVICE NO. **504**

HARDWARE

SP-1200AI, MP-5300AI PRINTERS

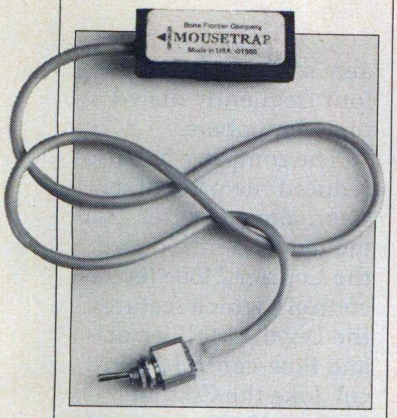
Hattori Seiko Computer Peripherals has introduced two dot-matrix printers—the SP-1200AI for home or small-business use and the MP-5300AI for high-volume businesses.

Compatible with Apple computers, the SP-1200AI prints at 120 cps in the draft mode and at 25 cps in the near-letter-quality mode. The quiet unit features dual IBM/Epson emulation modes and has front-panel controls replete with a six-print-mode selector. Other features include friction or adjustable tractor feed, a removable tractor unit, and automatic sheet loading with a cut-sheet-paper guide. Its carriage is 10 inches wide, and it comes with a ribbon cartridge that has a life of 2.5 million characters.

A quiet, wide-carriage 300 cps printer, the MP-5300AI is also IBM/Epson compatible and includes both parallel and serial interfaces. Other features include high-resolution graphics, a 6K buffer, automatic cut-sheet-paper loading, and rear and bottom paper feed. Its cartridge ribbon has a life of 12 million characters. *(List Price: SP-1200AI, $319; MP-5300AI, $899)*
Hattori Seiko Computer Peripherals
1111 Macarthur Blvd.
Mahwah, NJ 07430
(201) 529-4655
CIRCLE READER SERVICE NO. **505**

Hattori Seiko's SP-1200AI dot-matrix printer

L I N E



The Mousetrap from Bone Frontier Company

THE MOUSETRAP

The Mousetrap lets users obtain either mouse characters or inverse-video text on screen displays of enhanced and unenhanced Apple IIe computers at the flip of a switch. The unit is a stand-alone module designed to replace the IIe's character-generator ROM. With it installed, users need not select the display mode prior to booting but can switch display modes at any time while running a program. The product comes with all necessary components and instructions. *(List Price: $49.95)*

Requires: Apple IIe

Bone Frontier Company
P.O. Box 279
Broomfield, CO 80020
(303) 427-8729

CIRCLE READER SERVICE NO. **506**

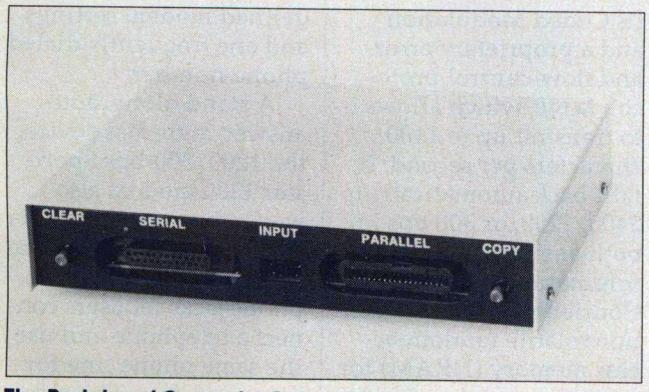
PERIPHERAL CONVERTER BUFFER

A universal interface device, the Peripheral Converter Buffer (PCB-1) is a full-function converter/buffer that can interconnect serial asynchronous RS-232 and Centronics parallel interfaces. The device can also connect one computer to two peripherals or two computers to one peripheral. It comes with 64K or 256K of buffer RAM to which users can dump data. They can then transmit the data to a peripheral at the appropriate speed for that device. Users can select any of 18 standard transmission rates from 50 to 38.4K bps. Front-panel Copy and Clear buttons turn the PCB-1 into an automatic copy machine, and DIP switches provide complete control of both input and output lines. Communications can be serial asynchronous, XON/XOFF, DTR, or parallel Centronics. *(List Price: 64K version, $269; 256K version, $329)*

Requires: Apple II Plus, IIe, IIc, or IIGS

IAM
P.O. Box 2545
Fair Oaks, CA 95628
(916) 961-8082

CIRCLE READER SERVICE NO. **507**



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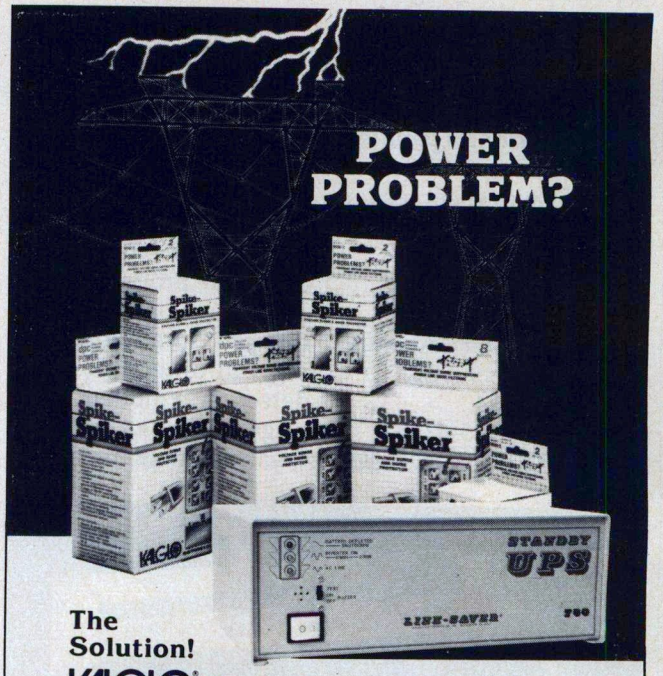

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PIPELINE

JUKI 7200 PRINTER

The Courier HST modem

A 24-pin, flat-bed-type, dot-matrix printer, the Juki 7200 has a print speed of 90 cps (10 cpi) and 108 cps (12 cpi) in its letter-quality mode and a speed of 270 cps (10 cpi) and 324 cps (12 cpi) in the draft mode. It can also print columns of 136, 163, and 244 characters at 10, 12, and 18 cpi, respectively, and features high graphics resolution. The printer has both a front and a rear paper-loading capability, allowing users to alternate between continuous and cut-sheet feeding. It can also print multipart single forms and can emulate a plotter via an optional plug-in board. The printer comes with friction and tractor feeders; a 7K buffer memory, expandable to 15K; and a Centronics parallel or RS-232C serial interface. An auto sheet feeder is included as an option. *(List Price: $2445)*

Juki Office Machine Corporation
20437 S. Western Avenue
Torrance, CA 90501
(800) 325-6134
In CA (800) 435-6315

CIRCLE READER SERVICE NO. **508**

USROBOTICS MODEMS

USRobotics has introduced two new modems in its Courier line and the low-end Sportster 1200 modem. All modems are designed for use on voice-grade, dial-up telephone lines and use an extended version of the AT command set, making them compatible with most popular data-communications software.

All Courier modems have help-screen summaries of the modem command set and S-registers, a printed operations summary on their bottom panel, an extended 12-function LED front-panel display, and externally accessible programming switches. They also feature call-duration reporting, call-progress detection, a modem-settings display, an on-board speaker, automatic speed detection with answer and originate, analog loopback self-test in answer and originate, the ability to repeat a command continuously, and internal test-pattern recognition.

The Courier HST (high-speed technology) modem provides full-duplex, 9600-bps data communication through an asymmetrical frequency division of the telephone channel. This design provides simultaneous 9600- and 300-bps data channels, with channel direction automatically assigned according to data-flow demand. The modem uses 32-state Trellis Coded Modulation and a proprietary error- and flow-control protocol, MNP, which allows it to transmit up to 1100 characters per second. It falls back automatically to 2400, 1200, or 300 bps in both answering and originating calls. The Courier HST also includes nonvolatile random-access memory (NRAM) for saving user-defined modem settings and up to four frequently dialed phone numbers.

The company has also reduced the price of its stand-alone Courier 2400 modem and introduced the Courier 2400e (error-control), which features the Level 3 MNP error- and flow-control protocol. Like the Courier 2400, the 2400e is an auto-dial, auto-answer, asynchronous modem that operates at 2400, 1200, and 300 bps. It works with any computer that has an RS-232C serial interface, is equipped with a buffer for storing incoming data, and has NRAM for saving user-defined modem settings and one frequently dialed phone number.

USRobotics' low-cost Sportster 1200 modem

A stand-alone, auto-answer, auto-dial device, the 1200/300-bps Sportster 1200 modem also works with any computer that has an RS-232C serial interface. Two RJ11C phone jacks let users connect a telephone and use the same phone line for voice and data. The mo-

The Juki 7200, a 24-pin color dot-matrix printer

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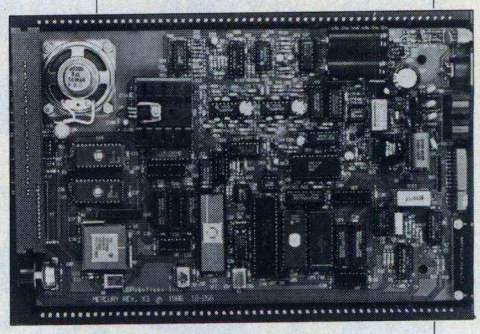

USRobotics' printed circuit board

dem reports call status with on-screen messages, can redial a number up to ten times automatically, and has two LED indicators that monitor data/test mode and carrier detect/received status. It also carries a printed operation summary on its bottom panel and has a thumbwheel switch that provides graduated control of its on-board speaker. Finally, the company has announced a software-certification program—it will now include a list of data-communication software that is compatible with its modems with each modem it ships. *(List Price; Courier HST, $995; Courier 2400e, $699; Courier 2400, $599; Sportster 1200, $149)*

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Skokie, IL 60076
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CIRCLE READER SERVICE NO. **509**

BY DEDINI

LAUGHTRACK

"You have just accessed the Big Dynamo-Data computer in Chicago. Your number has been turned over to our Enforcer Department. Exit immediately or you'll be the victim of a humongous power surge that will make our day."

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L I N E

SOFTWARE

STAMPS

An Apple II version of the STAMPS software package is now available. Designed for collectors of American postage stamps, the package contains the STAMPS program, two 5¼-inch diskettes containing a latest-market-value file for more than 2500 issues of U.S. stamps, and a 32-page manual. Users can update their market-price files by purchasing an annual update diskette. Also available is a demonstration Preview-Pack and a version of the program designed for collectors of United Nations issues. *(List Price: STAMPS, $95; update diskette, $25; Preview-Pack, $15; UN collectors' issues—first country, $95; any other country, $45)*

Requires: Apple II Plus, IIe, IIc, or IIGS; 48K RAM; two disk drives; printer

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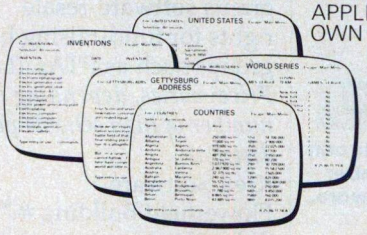

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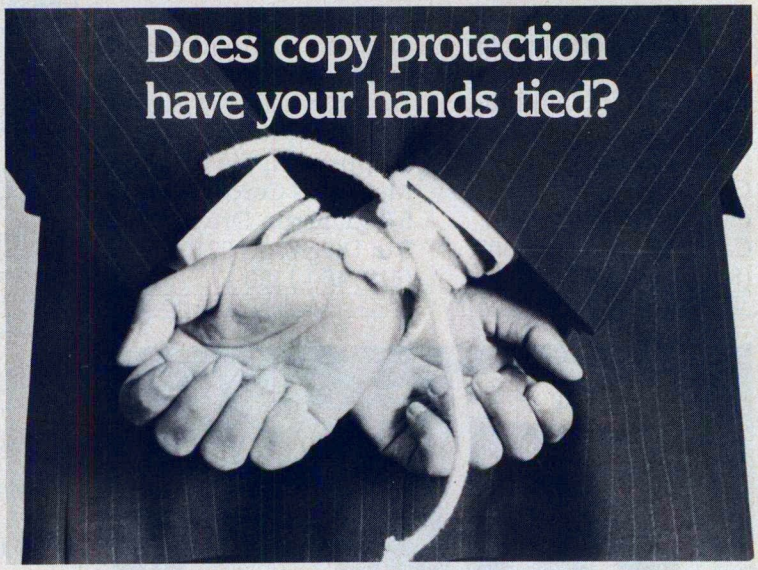

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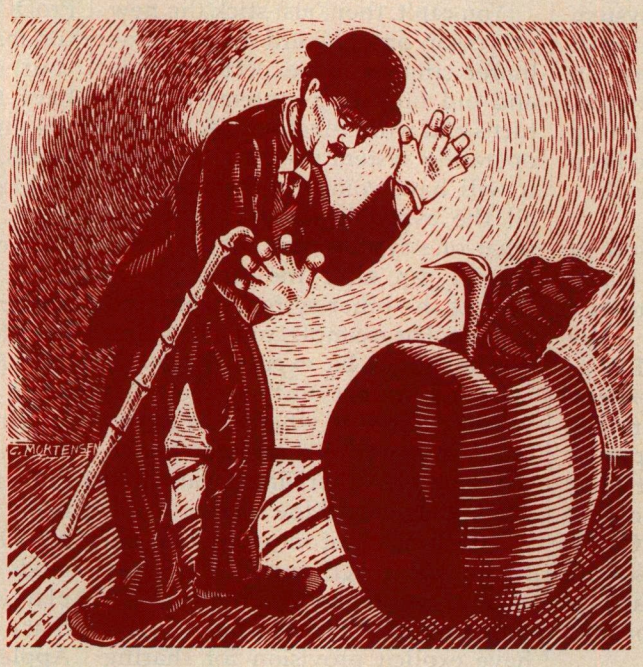
CIRCLE 262 ON READER SERVICE CARD

BY STEVE ROSENTHAL

TRANSPLANTING PC-DOS TO YOUR APPLE II

It's going to be a difficult operation that calls for clever surgeons

Adding a foreign operating system to an existing computer is much like doing an organ transplant—the benefit can be a longer and fuller life, but you have to face the danger that the new addition may turn out to be surprisingly incompatible. Fortunately for those of us who are thinking of combining software for IBM PCs with our Apple IIs (at least one company is planning to bring out a coprocessor board in coming months that will let you run IBM PC software on Apple II-series computers), even a complete rejection is unlikely to kill the patient.



The ability to run PC-DOS software does have some attractive points. Many programs for the IBM PC are not available in Apple format, and if you wanted to take work home from the office, an Apple/IBM combination would allow you to bring your office data files home to use on your Apple.

Will people be willing to pay for such a pairing? My guess is that a PC-DOS coprocessor for less than $300 would find many takers. A few of us might fork over $500, and only the truly obsessed or idle rich would entertain the idea if the price approached $1000.

Actually, the Apple II line has a long history of tolerance toward guest operating systems. Along with the various speed-up ROMs and improved BASICs that mimic the essential operation of Apple DOS, additional choices such as UCSD Pascal and CP/M have been available to those who have wanted a major software transfusion. In addition, Apple itself did more than cosmetic surgery in replacing DOS 3.3 with ProDOS.

The compatibility gap between these alternatives and DOS, though significant, was still a good deal narrower in some important ways than that between DOS or ProDOS and PC-DOS. As we'll see, bringing up PC-DOS on an Apple II may turn out to be a difficult and slightly messy process.

Where's That Map?

For practical purposes, you can think of a personal-computer operating system as comprising three essential parts: the user interface, the file system, and the DOS services.

The user interface is the part of the operating system we see on the screen and the way the system reads what we enter. It may present us with prompts for command inputs, or it may use the point-and click system of the IIGS and the Macintosh. When most of us say that we like or dislike an operating system, we're really expressing our opinion about that interface.

User interfaces can be integral to an operating system or constructed as an independent outer layer. Many older operating systems, including Apple DOS, were built with much of the user interface intertwined with the rest of the system, so it's not always easy to sort out their exact internal boundaries. Newer systems, such as the Macintosh with its separate Finder, attempt to keep the system interface in an identifiable and replaceable location.

The second major part of the operating system, the file system, is the arrangement that the computer uses to keep track of our data files and programs when we store them away. For anything but the simplest personal computers, since the arrival of the Apple II disk drive, that's meant how files are stored on disks (so, in practice, *operating system* and *DOS* [disk-operating system] have become synonymous).

File-system design is one of those areas that has a large body of accepted theory, but experts still often disagree on the details of putting ideas into practice. Therefore, each oper-

ILLUSTRATION BY CRISTINE MORTENSEN

ating system generally makes a different series of trade-offs among storage efficiency, access speed, reliability, and device independence.

DOS services are the collection of tasks a system offers programs so that each one won't have to include code for common functions and, just as importantly, so programs can ask for services without regard for the specifics of any hardware operations that may vary among different installations.

Most operating systems start with a small and efficient set of services but, as time and revisions go by, add more and more sophisticated and complex features. Those additions make it easier and easier to write demanding programs (because you have more tools and prefabricated parts of programs to work with) but harder and harder to get multiple operating systems to work together.

All these parts of the operating system together manage what is generally called the system's resources: the hardware functions, available storage, and system-software subroutines that the system can call on to accomplish internal tasks and our external requests. Up to a point, a richer set of resources simplifies matters for the operating system, but having too much to keep track of can be a problem as well.

What PC-DOS Needs

Given that conceptualization of the operating system, we can take a look at what it would take to run programs on the Apple II that really expect their host to be an IBM PC.

For starters, any program expects to find the defined DOS services; i.e., if a program sets up the proper parameters and calls DOS, it must get the same results it would if it were running on an IBM PC. Although not every program uses every DOS service, it's not always possible to tell which are needed and which are not.

Emulating clearly defined DOS calls is a practical possibility, one that happens often on large computers when hardware is upgraded more quickly than software. That tactic doesn't, however, solve the problem of what to do with the internal code of a PC-DOS program that expects to operate on an 8088-type processor chip.

Theoretically, if we're willing to wait for the translation and have enough storage available, any general-purpose computer chip with the right emulation software can do all the tasks any other chip does—so the 6502 processor chip of the more senior members of the Apple II line can potentially run PC-DOS software in a software-assisted emulation mode. In practice, however, emulating a more complex chip such as the 8088 with a simpler one such as the 6502 can be an extremely slow process. It wasn't practical even to emulate the mid-complexity Z80 chip that let us use CP/M on the 6502.

The answer, obviously, isn't to emulate but to add the necessary coprocessor to run the guest operating system in its native environment (we'll have to see whether the 65816 processor in the IIGS is powerful enough for a software-only emulation). The trade-off there is that although adding a coprocessor solves the problem of how to execute the foreign code of guest programs, you have a new problem of coordinating the guest's and host's needs for system resources.

You can't, then, just stick the new processor onto a card with a few buffer circuits and expect the new and old operating systems to take turns and work together. Because an operating system normally assumes it will have complete command of all the available system resources, what one system does while it has control can alter the state of resources the other system needs and expects. For example, one operating system might be expecting you to answer a prompt on the screen that would determine whether or not to erase your entire disk—not knowing that the other had meanwhile completely erased the screen.

File-system incompatibilities between Apple DOS and PC-DOS may also prove to be a problem. Although both ProDOS and PC-DOS have explicit provision for sharing disks with other operating systems (and you can easily trick Apple DOS into doing the same), they do that strictly by partitioning disks into dedicated regions. Neither system now has a built-in method of reading foreign disks or of accepting a mix of native and foreign control of disk resources.

As an initial strategy, partitioning of disks is not a bad idea, and if all you want to do is have disks share operating systems to limit the clutter on your desk, this method may be sufficient. If you want to be able to share data freely between Apple and IBM programs, however, partitioning disks has the effective result of having two logically separate machines that can't be used at the same time, rather than one machine that runs two families of software.

With some clever programming, a partial solution may be available. If programs are well behaved and make all their disk-resource requests through the DOS services, then programmers can write code that intercepts those calls and provides the equivalent result with a different file system (that's what the TOPS software package, for example, does between Macs and IBM PCs). We may not see that kind of sophistication on the first generation of PC/Apple products, but if the demand is there, it should arrive in a subsequent go-around.

The user-interface disparity, by contrast, is probably the simplest to solve. Because the normal operating interfaces are well partitioned in ProDOS and PC-DOS and both are command-line style, you can give your commands in one style and have them translated directly into the information the other system needs. That's not true, though, if you look at graphic interfaces such as those of the IIGS, or Windows or GEM on the PC. These systems make heavy demands on a wide range of system resources and are therefore hard to translate.

In fact, graphics is likely to be the worst sticking point of any attempt to bring up PC-DOS on any pre-IIGS Apple II. Programs that run on the PC are entitled to assume—and many do—that they have a 25-line by 80-column display in the text mode and up to a 640 × 400-dot display in the graphics mode. Because that's more lines and dots than the Apple II hardware provides, it will take some very clever resource management to provide resources that just aren't there.

Fortunately, cleverness in general and solutions that bring the best out of available hardware have been the hallmark of the Apple community since Steve Wozniak tweaked up the original Apple I. It may be a difficult, messy job to bring up PC-DOS on the Apple II, but you can bet it's one transplant that someone out there is going to do. +

Rescue Squad

BY GARY B. LITTLE AND CRAIG CROSSMAN

80 COLUMNS FOR TAXAN

Q. *I currently have an Apple II Plus with a Taxan RGB color monitor. I want to add 80-column capability, but none of the 80-column cards work with my Taxan. Help!*

Dave Webber
Federal Way, WA

A. Telemax, Inc., in Warrington, Pennsylvania ([215] 343-3000), manufactures the $99 Colormaster RGB card, which goes into slot 7 of an Apple II Plus. You can purchase any 80-column card and plug it into slot 3. Then you chain your 80-column card to the RGB card and chain the RGB card into your monitor. —*CC*

DATING ProDOS FILES

Q. *When I catalog a ProDOS disk, I get the notation* <no date> *opposite my filenames because I don't have a clock card installed. Is there any way I can tell ProDOS to use an actual date without having to buy a clock card?*

Guy Ami-ad
Herzeliyya, Israel

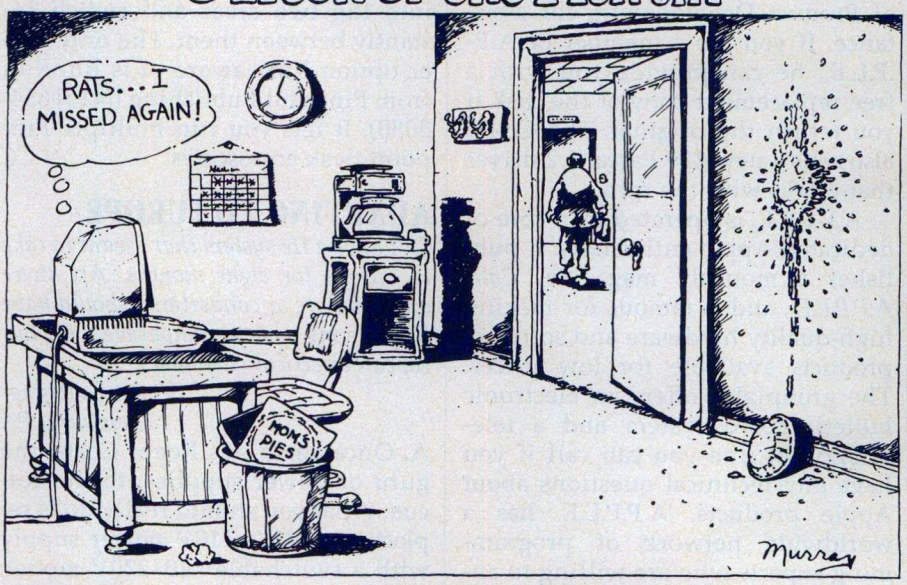
A. The standard ProDOS 8 clock driver returns the date, in encoded form, at locations $BF90 and $BF91 in the ProDOS global page. If you don't have a clock, the locations are always zero (meaning "no date"), unless you POKE new values. By placing the current date in these locations when you start up ProDOS, you can get your files stored with the appropriate date.

Writing a short program to store the date is simple once you know the format of the date bytes. Bits 0 to 4 of $BF90 contain the day of the month, bits 5 to 7 of $BF90 and bit 0 of $BF91 contain the month (1 = January), and bits 1 to 7 of $BF91 contain the last two digits of the year.

Your ProDOS start-up program should begin by asking you to enter the date. It must then convert the date to numeric form, and then store the appropriate values in 49040 ($BF90) and 49041 ($BF91) with POKE statements. This program fragment shows you the form of these two POKEs:

```
100 MO=9 : DY=21 : YR=87 :REM September 21,
    1987
200 POKE 49041, 2*YR + (MO›7)
300 POKE 49040, DY + 32 * (MO - 8*(MO›7))
```

—*GBL*



ASSEMBLY LINES

Q. *I've been told that a book called* Assembly Lines *is the best introductory guide to 6502 assembly language. Where can I get a copy?*

Gary Ruderman
Holmdel, NJ

A. This book, written by former schoolteacher Roger Wagner, was originally published by *Softalk*, a magazine that went out of business more than two years ago. *Assembly Lines* has often been praised for its clarity and easygoing style. It is based on a series of articles Wagner wrote for his *Softalk* column. You can now order the book directly from Roger Wagner Publishing, Inc., 10761 Woodside Avenue, Suite E, P.O. Box 582, Santee, CA 92071; (619) 562-3670 —*GBL*

COMMUNICATING WITH A MAINFRAME

Q. *I have an Apple IIc and a Hayes Smartmodem. I want to connect to my school's mainframe, but to do that I have to call an operator first, who then transfers me to the correct extension. What is the best procedure for calling the mainframe in these circumstances?*

Ghaith Abdel-Kadir
Pittsburg, KS

A. If you place a semicolon at the end of your Smartmodem dialing string, the Smartmodem won't try to turn on its originate tone unless the operator has a voice that matches the frequency of a modem's answer tone! That is, dial with ATD687-7144;—not ATD687-7144 [Return]. When the operator answers (you'll hear the voice through the Smartmodem speaker), pick up a handset you've got hooked up to the same phone line, verbally ask for your extension, and hang up the handset. As soon as you hear the mainframe generate its answer tone, type ATO ("oh" not "zero") to turn on the Smartmodem's originate tone. You can then begin to communicate with the mainframe. —*GBL*

ILLUSTRATION BY TOM MURRAY

NEW RAMDISK DRIVER

Q. *I've accidentally destroyed the DOS 3.3 RAMdisk driver for my 288K Synetix RAMCard. I've written Synetix, but the company is out of business. Where can I get a replacement for my disk?*

Luis de la Cerda Delpin
Santiago, Chile

A. The A.P.P.L.E. Co-op (290 S.W. 43rd, Renton, WA 98055; [206] 251-5222) was a major distributor of Synetix products a few years ago, so I called Charles Stillman, its Manager of Product Development, for assistance. If you are a member of A.P.P.L.E., he can provide you with a free replacement copy of the disk if you return the original. The Co-op also sells a new $20 Pascal 1.2 driver that works with the card.

A.P.P.L.E. is operated by a core of dedicated Apple enthusiasts. It publishes a monthly magazine, *Call-A.P.P.L.E.*, and is famous for making high-quality hardware and software products available for low prices. The group also offers an electronic bulletin-board system and a telephone hot line you can call if you have any technical questions about Apple products. A.P.P.L.E. has a worldwide network of programming experts who are willing to answer questions for no charge (except, perhaps, when they call you collect with the answer).

The initial membership fee for A.P.P.L.E. is $49, which includes a one-time initiation fee; annual dues thereafter are $23. —*GBL*

SWITCHING IN RAM

Q. *My IIe has more than 570K of RAM. I want to know if there are any Switcher-like programs that will allow me to keep several programs in RAM at once and let me switch between them.*

Richard Treakle
Los Altos Hills, CA

A. Here's a partial solution: Beagle Bros. ([619] 296-6400) offers a program named Extra K that partitions 128K in an Apple IIe into two 64K areas, allowing you to load programs into the two areas and switch instantly between them. The only other option I am aware of is RunRun from Pinpoint Publishing ([415] 654-3050). It lets you run multiple Pinpoint desk accessories. —*CC*

ADAPTING TO EUROPE

Q. *I have a IIe system that I want to take to Europe for eight months. Are there any adapters or converters I should have to make my system compatible with European electrical currents?*

Violet Gallagher
Lewisburg, PA

A. Once again, it's Roger Coats, the guru of power supplies, to the rescue. What you should really do is replace your IIe's 110V power supply with a switchable 110/220V model; that way you can use it on both sides of the Atlantic with ease. You will also need a power-plug adapter that can mate with all those strange-looking European power outlets. Both items are available from Coats at (619) 274-1253. —*GBL*

BOOK RECOMMENDATIONS

Q. *I have been unable to locate three books you often refer to in "Rescue Squad," namely* Inside the Apple IIe, Inside the Apple IIc, *and* Apple ProDOS: Advanced Features for Programmers. *Where can I find them?*

Arthur Guertin
Ledyard, CT

A. Programmers find these three books useful because they contain a great deal of meaty technical information and lots of interesting program examples. I never hesitate to recommend them, mainly because I wrote them! The publisher of these books, Brady Communications, is now part of Prentice Hall Press, a division of the Simon & Schuster publishing empire. Your local bookstore should be able to order them for you from the Prentice Hall Press catalog. If you need them quickly, I suggest you give the A.P.P.L.E. Co-operative a call at (206) 251-5222—it usually has them in stock. —*GBL*

Please send your questions and problems to Rescue Squad, A+, 11 Davis Drive, Belmont, CA 94002.

Craig Crossman is vice president of operations for an authorized Apple dealer in West Palm Beach, Florida. He is a contributing editor for other Apple publications and the Apple expert for The Source and Viewtron. Gary Little is the author of Point-to-Point, Pinpoint's telecommunications program for the IIe, IIc, and IIGS.

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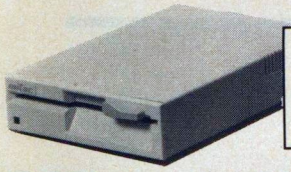

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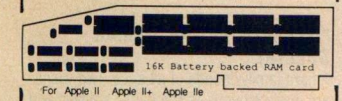

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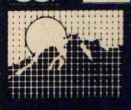

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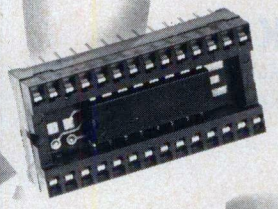

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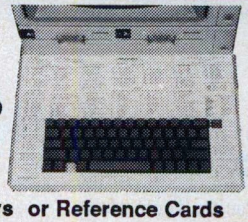

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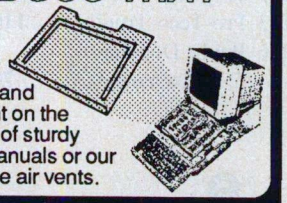

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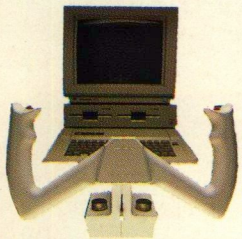
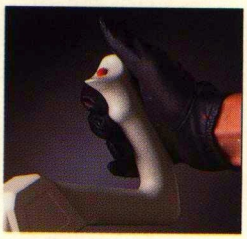


Maxx™ is positioned front & center and allows easy keyboard access.

First, the keyboard.

Whether your interest is in F-16 jets, Cessnas, auto racing, tank operations or space flight, Maxx™ excels.



A contour handle provides the "feel" of a real yoke.

Maxx™ is currently compatible with IBM's PC, XT and AT models through the fifteen-pin game port. And with Apple Computer's IIc, IIe and II GS series through the nine-pin game port.

Then, the mouse.

Designed to the specifications of the traditional aircraft control yoke, Maxx™ looks, feels and performs realistically.

Strategically placed buttons are located atop each arm of the yoke. And a centrally located slide throttle controls airspeed.

Maxx™ is easy to use. Boot-up the selected software disk, calibrate Maxx™ to the system and experience desk-bound reality.

Maxx™ comes fully assembled, ready to use. A true plug-and-play Computer Interface Peripheral (CIP).

And now, MAXX™.

Flight maneuvers are a breeze with the "feather-touch" of Maxx™. Action buttons are strategically placed.

For more information, or to order, call 1-(206) 451-9082 or mail $129.95 plus $5.00 for shipping and handling to Icon Incorporated, 1611-116th Avenue NE, Bellevue, Washington 98004.

CIRCLE 112 ON READER SERVICE CARD

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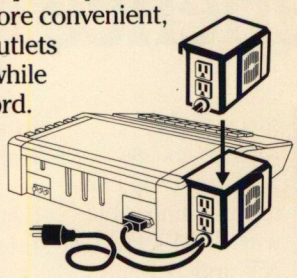
Available in two colors—original Apple Beige and new Apple Platinum.

MORE THAN ¼ MILLION APPLE II's SAVED

SYSTEM SAVER® from Kensington Microware quietly protects more than 1/4 million Apple® II's every day. Often referred to as "the piece Apple forgot," System Saver's unique combination of features have made it the most versatile, most convenient, best selling accessory ever made for the Apple.

System Saver organizes your power needs.

To make your Apple system more convenient, System Saver provides extra outlets for your monitor and printer, while replacing the Apple's power cord. One front-mounted power switch controls your whole system.



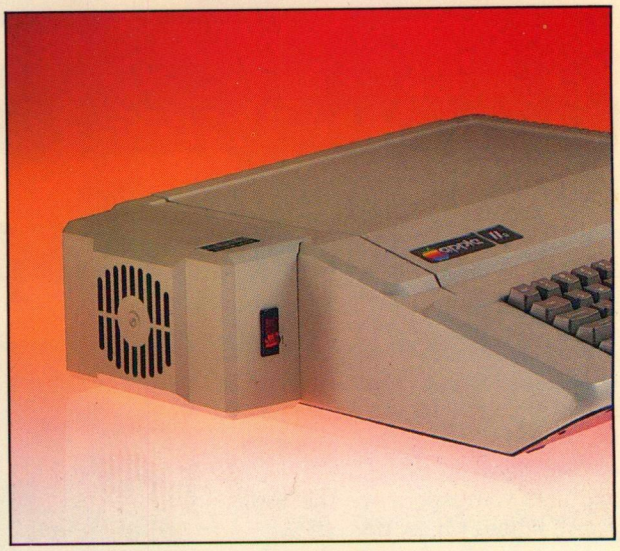
System Saver solves power line problems.

Impurities in the power supply cause 70-90% of all microcomputer malfunctions. Line noise can be interpreted as data, confusing your Apple and causing annoying system errors. Power surges and spikes can do costly damage to your computer's delicate circuitry.

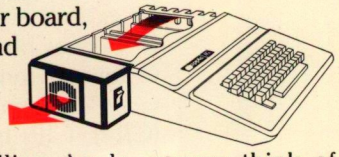
System Saver clips surges and spikes at a safe level and filters out line noise. It makes your Apple more accurate, more efficient and more reliable.

System Saver keeps your Apple cool.

Peripheral cards added to your Apple not only generate heat, they block any natural air flow through the computer. The resulting high temperature conditions can potentially shorten the lives of both your Apple and your peripheral cards.



System Saver's quiet fan draws a breath of fresh air across the Apple's mother board, over the power supply and out the side ventilation slots at the rate of 17 cubic feet per minute.



More than 1/4 million Apple owners think of System Saver as the piece Apple forgot. And 1/4 million well-protected Apples agree.

For a dealer near you, or to speak to a Kensington sales representative, call toll free (800) 535-4242 In NY (212) 475-5200.

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System Saver is UL Listed. System Saver's surge suppression circuitry conforms to IEEE specification 507 1980, Category A. Also available in 220/240 Volts, 50/60 Hz.

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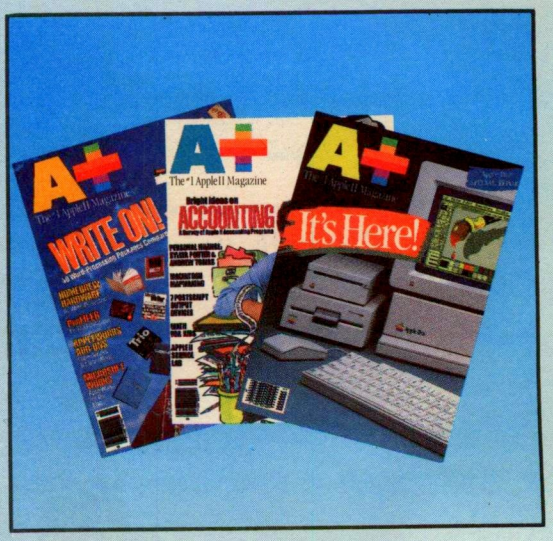

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